EEI BULLETIN

• SEPTEMBER, 1960 •

'Flameless,' New Theme of LBE, Gets Wide Support from Industry, Allies

Looking Ahead in Farm Electrification

Grover C. Neff

Substation Maintenance and the Maintenance Dollar

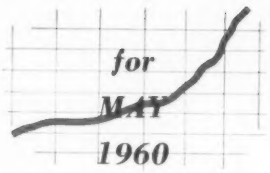
R. F. Stuart

Internal Auditing and EDP

H. R. Symes

PUBLISHED BY EDISON ELECTRIC INSTITUTE

ELECTRIC UTILITY INDUSTRY Statistics IN THE UNITED STATES



Current Statistical Data Covering 100 Percent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities) — May, 1960

	1960	1959	%
SOURCE AND DISPOSAL OF ENERGY			
NET GENERATION* (Kwhr in Thousands)			
By Fuel Burning Plants	47,308,199	45,923,982	+ 3.0
By Water Power Plants	13,035,665	11,737,408	+ 11.1
Total Generation	**60,343,864**	**57,661,390**	**+ 4.7**
Add—Net Imports over International Boundaries	471,060	493,125	— 4.5
Less—Company Use	165,573	166,180	— 0.4
Less—Energy Used by Producer	1,832,258	1,571,352	+ 16.6
Net Energy for Distribution	**58,817,093**	**56,416,983**	**+ 4.3**
Lost and Unaccounted for	5,986,887	6,007,367	— 0.3
Sales to Utimate Customers	**52,830,206**	**50,409,616**	**+ 4.8**
CLASSIFICATION OF SALES			
NUMBER OF CUSTOMERS—As of May 31			
Residential or Domestic	49,364,676	48,165,462	+ 2.5
Rural (Distinct Rural Rates)	1,564,554	1,642,133	— 4.7
Commercial or Industrial:			
Small Light and Power	6,376,510	6,301,209**	+ 1.2
Large Light and Power	345,526	343,592**	+ 0.6
Other Customers	198,216	191,215	+ 3.7
Total Ultimate Customers	**57,849,482**	**56,643,611**	**+ 2.1**
KILOWATT-HOUR SALES—DURING Month of May (Kwhr in Thousands)			
Residential or Domestic	14,077,723	12,975,359	+ 8.5
Rural (Distinct Rural Rates)	1,033,047	1,087,739	— 5.0
Commercial or Industrial:			
Small Light and Power	8,782,006	8,201,349**	+ 7.1
Large Light and Power	26,781,379	26,215,091**	+ 2.2
Street and Highway Lighting	455,220	423,770	+ 7.4
Other Public Authorities	1,272,013	1,161,430	+ 9.5
Railroads and Railways	375,704	289,352	+ 29.8
Interdepartmental	53,114	55,526	— 4.3
Total to Ultimate Customers	**52,830,206**	**50,409,616**	**+ 4.8**
Revenue from Ultimate Customers (Thousands)	**$891,937**	**$841,988**	**+ 5.9**
RESIDENTIAL OR DOMESTIC SERVICE			
AVERAGE CUSTOMER DATA—for 12 months ended May 31, 1960			
Kilowatt-hours per Customer	3,689	3,437	+ 7.3
Average Annual Bill	$91.63	$86.61	+ 5.8
Revenue per Kilowatt-hour	2.48¢	2.52¢	— 1.6

* By courtesy of the Federal Power Commission.
** Revised for comparison purposes.

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The EDISON ELECTRIC INSTITUTE BULLETIN is published monthly, except bi-monthly in July and August, by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of private electric utilities in North, Central and South America and contiguous islands in the Western Hemisphere.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

Closing date for the BULLETIN is the tenth of the month preceding the month of issue.

Manuscripts and correspondence relating to the BULLETIN should be addressed to the Editor, Edison Electric Institute, 750 Third Ave., New York 17, N. Y.

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Conventions and Meetings

1960

October

3- 4 PEA Systems Planning Committee, Erie, Pa.

3- 5 EEI Prime Movers Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

5- 7 Missouri Valley Electric Association Sales & Rural Conference & Home Service Workshop (joint meeting with International Association of Electrical Leagues), President Hotel, Kansas City, Mo.

5- 7 Wisconsin Utilities Association Electric & Gas Sales and Operating Sections Convention, Schroeder Hotel, Milwaukee, Wis.

6 EEI Power Survey Committee, EEI Headquarters, New York City, N. Y.

6- 7 EEI Accounting Division Executive Committee, Sheraton Plaza Hotel, Boston, Mass.

6- 7 EEI Transmission and Distribution Committee, Sheraton Jefferson Hotel, St. Louis, Mo.

6- 7 PEA Electrical Equipment Committee, Philadelphia, Pa.

9-14 AIEE Fall General Meeting, Chicago, Ill.

10-12 AIEE National Electronics Conference, Chicago, Ill.

13-14 EEI Advertising Committee, EEI Headquarters, New York City

13-14 EEI Public Relations Committee, Drake Hotel, Chicago, Ill.

13-14 PEA Meter Committee, Altoona, Pa.

17-18 EEI Electrical Systems & Equipment Committee, Hotel Northampton, Northampton, Mass.

18-19 EEI Sales Division Executive Committee, EEI Headquarters, New York City

19-20 *Electrical World's* 2nd Street and Highway Lighting Conference, Hotel Ambassador, Chicago, Ill.

20-21 Electric Council of New England 4th Annual Conference, Hotel Somerset, Boston, Mass.

20-21 PEA Systems Operation Committee, Castleton Hotel, New Castle, Pa.

20-21 Southeastern Electric Exchange Engineering & Operation Section, The Shoreham Hotel, Washington, D. C.

20-22 PIP Second National Youth Conference on the Atom, Museum of Science & Industry, Chicago, Ill.

22-26 Controllers Institute of America 29th Annual National Conference, Hotel Fairmont, San Francisco, Calif.

24-26 EEI Insurance Committee, French Lick Sheraton, French Lick, Ind.

25-27 American Standards Association National Conference on Standards, Sheraton-McAlpin Hotel, New York, N. Y.

26-29 Rocky Mountain Electrical League Annual Meeting, Colorado Springs, Colo.

27 BLBS Executive Committee, New York, N. Y.

27-28 EEI Statistical Committee, The Homestead, Hot Springs, Va.

27-28 PEA Transmission & Distribution Committee Fall Meeting, Hotel Alexander, Hagerstown, Md.

27-29 Canadian Electrical Association, Western Zone Engineering Sections, Regina, Sask., Canada

31-
Nov. 2 Canadian Electrical Association, Western Zone Sales & General Sections, Calgary, Canada

November

2- 4 EEI-AGA Taxation Accounting Committees, The Cloisters, Sea Island, Ga.

9-10 New Jersey Utilities Association Annual Meeting, Seaview Country Club, Absecon, N. J.

14-16 EEI Accident Prevention Committee, Statler-Hilton Hotel, Buffalo, N. Y.

14-18 NEMA Annual Meeting, Traymore Hotel, Atlantic City, N. J.

15-16 EEI Commercial Cooking and Water Heating Committee, Roger Smith Hotel, New York City

15-16 EEI Area Development Workshop, Park Plaza Hotel, St. Louis, Mo.

16-18 Southeastern Electric Exchange General Sales Conference, Henry Grady Hotel, Atlanta, Ga.

18-22 Air-Conditioning and Refrigeration Institute Annual Meeting, Hollywood Beach Hotel, Hollywood Beach, Fla.

27-
Dec. 2 ASME Winter Annual Meeting, Statler-Hilton Hotel, New York City, N. Y.

28-30 EEI-AGA Electronic Seminar, Atlantic City, N. J.

28-
Dec. 1 NARUC Convention, Las Vegas, Nev.

30 ECAP Copy Group Meeting, New York City, N. Y.

30-
Dec. 1 EEI Street and Highway Lighting Committee, Cincinnati, Ohio

December

1- 2 Pacific Coast Electrical Association Administrative Service Fall Conference, Hotel Safari, Scottsdale, Ariz.

8 EEI Industrial Relations Committee, Roosevelt Hotel, New York City, N. Y.

8- 9 EEI-AGA Depreciation Accounting Committee, Atlanta Biltmore, Atlanta, Ga.

1961

January

19-20 EEI Industrial Relations Committee, Chase Park Plaza Hotel, St. Louis, Mo.

23-26 Canadian Electrical Association, Eastern Zone Meetings All Sections, Halifax, Canada

25-26 Southeastern Electric Exchange Legal and Claims Committee, Miami Beach, Fla.

29-
Feb. 3 AIEE Winter General Meeting, New York, N. Y.

'Flameless'—New Theme of LBE Gets Wide Support from Industry, Allies

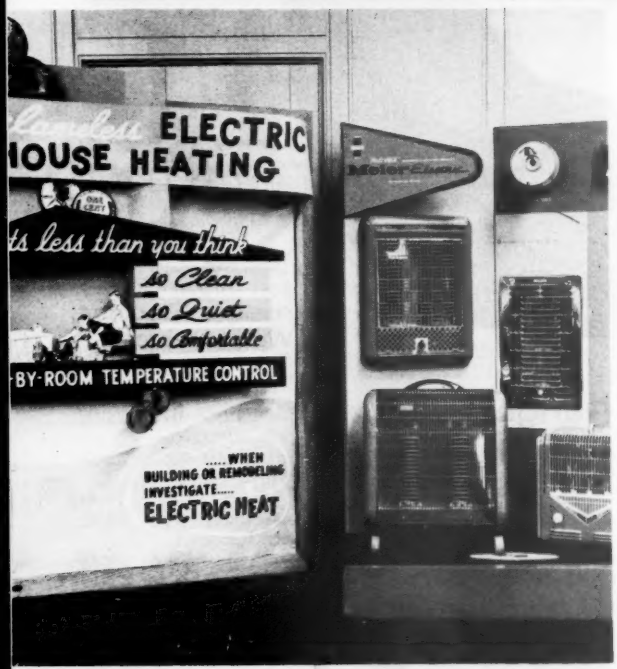
THE "flameless" theme adopted by the EEI Live Better Electrically program for its advertising schedule has received tremendous industry support, W. M. Shepherd, Vice President of Arkansas Power & Light Co., and Chairman of the LBE Policy Committee, has announced.

60 Companies Use 'Flameless'

Sixty EEI member companies throughout the nation are using the word "flameless" in their local advertising programs. Hundreds of thousands of lines of advertising featuring this theme have been carried in local newspapers since the slogan was introduced at the EEI Sales Conference last April in Chicago.

Point-of-purchase materials and outdoor advertising posters also are being used by electric companies to bring the "flameless" message of electricity to the consumer. In addition to electric company advertising on the local level, manufacturers of electrical appliances have announced that the word "flameless" will appear in their ads for such products as ranges, water heaters, clothes dryers, house heating equipment and the total electric Gold Medallion Home.

Electric utility companies are using outdoor advertising to bring the story of "flameless" electricity to their customers. This roadside sign was erected by Metropolitan Edison Co. in Pennsylvania to point out the advantages of a flameless electric water heater.



Distributors of electrical appliances throughout the nation are adopting "flameless" for their displays. In photograph above, "flameless" electric house heating is suggested, and in the one at right, several advantages of electric water heating are listed.

The EEI Live Better Electrically program, supported by 140 member companies, is using this theme in its full-page advertisements and spreads now appearing in *Saturday Evening Post, Better Homes & Gardens,* and several magazines directed to the building trade.

Inter-Industry Coordinator

Frank Kitzmiller recently was appointed LBE inter-industry coordinator, Ralph Zeuthen, LBE Manager, said, to work with manufacturers and other allies in lining up all segments of the industry behind the advertising themes.

All point-of-purchase materials for use during 1961 have been sent to the utilities by the Live Better Electrically program. They include kits on electric ranges, water heaters and clothes dryers, all tied to the "flameless" copy theme of the four-color ads to be run in national consumer magazines.

The three packages were produced several months before the start of the new year to allow utilities time to use the materials in their own sales meetings, in meetings with appliance dealers, and to work key elements into their own advertising schedules now being considered for 1961.

Mr. Shepherd said recent surveys of electric company executives and appliance dealers guided the creation of the 1961 kits. Both groups, he said, urged strong, imaginative copy and greater opportunity for effective tie-in with national advertising themes.

The new LBE point-of-purchase materials—window streamers, circular display pieces, pennants, price stickers and silent salesmen—were designed to multiply the impact of the "flameless" advertising message in dealer stores by calling attention to customer benefits resulting from the use of "flameless" electricity.

Animal Motif Used

These customer benefits are symbolized by an animal motif. A swan illustrates the cleanliness of electric cooking, while the safety factors of electric water heating and electric clothes drying are pointed up through the use of a baby kangaroo in its mother's pouch—in water heating materials—and a duckling wearing a life preserver—in the clothes dryer materials.

The kit includes also 20-, 30- and 60-second radio commercials which will stress "flameless" benefits of electricity to customers in the service areas of individual utilities. The commercials invite customers to "see your electric appliance dealer today."

The Live Better Electrically promotional materials —formerly aimed at "surge" periods—will be available from September, 1960, through all of 1961. National magazine ads emphasizing electric ranges, water heaters, clothes dryers, electric house heating, and Gold Medallion Homes will be scheduled throughout 1961, giving the electric companies and appliance dealers greater flexibility in scheduling their own tie-in programs.

BE FOXY—
BUY NOW!
Flameless Electric
Clothes Dryer
SO SAFE—SO CLEAN—SO MODERN—
NO FUMES WITH FLAMELESS ELECTRICITY
Be foxy! See your electric appliance dealer today.
He's featuring real bargains in modern living—all new electric clothes dryers. Did you know that you can save three whole weeks of hard work a year with an electric dryer? No more hanging heavy wet wash—cuts ironing time in half. Save on clothing bills, too—you need fewer clothes because the clothes you dry electrically stay new-looking longer, don't fray or fade as they would with old-fashioned methods.
FREE! Call your LP&L office and have one of LP&L's Home Service Representatives plan your laundry area for greatest efficiency and convenience. No obligation. Call today.
LIVE BETTER ELECTRICALLY
Louisiana Power & Light Company
"Helping Build Louisiana"

Louisiana Power & Light Co. was among the EEI member companies which used the LBE "Be Foxy" advertising kit for the promotion of electric clothes dryers.

What They Are Saying About 'Flameless'

This ad was scheduled by The Kansas Power and Light Co. during the hot summer months. With its snow-covered numerals, it was a successful eye-catcher. "Flameless" was promotion feature.

8°-16°
COOLER
WITH A
FLAMELESS
ELECTRIC
RANGE
Reddy Kilowatt is not out-of-season in his Eskimo costume . . . he's cooking on the coolest electric range. You'll appreciate how chilly he feels when you try cooking the flameless electric way. Actual U. S. Government tests have proved the electric range to be 8°-16° cooler than any other type! You see, all the clean electric energy goes into the pan — so you won't need a fan. Be cool like Reddy . . . cook electrically!
See your dealer for a breathtakingly cool Electric Range
The KANSAS POWER and LIGHT COMPANY

Reaction of the electric companies, their allies and the press has been extremely favorable to the "flameless" approach in advertising and promotion, Mr. Shepherd said.

Utility Executives

Here are excerpts from typical letters from utility executives:

"The 1960-61 Live Better Electrically program looks like the best ever."

"Our people are very much taken with the EEI ads — can we get 110 advance proofs (in color, if in color) of each national ad as it is ready for release?"

"If you have no objection to letting us use EEI materials in the future, I would appreciate it if you would send me an additional copy of your brochure outlining the current EEI program which includes the proofs of the new two-page spreads."

"We have examined the new LBE program, which emphasized the word 'Flameless'; the continuing theme 'Live Better Electrically,' and the Medallion Home program. We are, and have been, using the emblems, slogans, etc., at every opportunity in our brochures, advertising, billboards, and other sales promotion materials that we have developed. The Live Better Electrically Medallion Home program is *the* number one sales activity in our company."

"Here's an example of a highly ..ssful 'Flameless' electric water ..eating promotion. . . . As you can see from the newspaper sections enclosed, dealers and plumbers tied in enthusiastically. And the repetition of the word 'Flameless' as it appeared time after time on these newspaper pages couldn't help but make an impression on homemakers throughout our area.

"I have been very pleased with the development of a more aggressive policy by the Live Better Electrically program. We intend to step up our own program and will coordinate it closely with the national effort."

"We have just finished reviewing the plan preview brochure with considerable enthusiasm. We think the new program is terrific and plan to use all available material, where possible during the last half of 1960 and 1961."

"Congratulations on a tremendous "Flameless" package! When can I get my hands on the stuff. . . . We're itching to get going. In particular, I'm interested in the local promotion and display materials, repros and reprints of national ads."

"I gave Bob MacDonald's talk to our own group. . . . It was well received and I expect (our) advertising will now make much greater use of 'Flameless'."

"The material enclosed is a pretty good representation of (our) use of the word 'Flameless' in backing up the LBE copy theme."

"Enclosed are a few newspaper ads and one of our daily radio commercials in which you will note that we have used the word 'Flameless.' . . . Since the adoption of the 'Flameless' theme we have utilized it wherever possible in our radio and newspaper advertising. We plan to use it more in the weeks and months to come."

"We have very little at present that has taken full advantage of the word 'Flameless' but it has been

ELECTRICITY
IS YOUR *fast and flameless* WAY TO COOK!

On the busiest days—how you'll appreciate the safe and speedy help of your new electric range! Just set the controls . . . ovens, broiler or surface units quickly heat to the desired temperature. And it's controlled heat—even and accurate, for dependable results.

What's more, a modern electric range puts the heat just where you want it—in the food, not in your kitchen. And there's no pilot to light—no flame to smoke or go out. No waste, either. Electric cooking's the ideal way to get better results, with less time and work.

In every way, electric cooking is better—cleaner—and more enjoyable. For a close look at the new and wonderful features, visit your dealer during the All-Electric Kitchen Carnival!

ALL-ELECTRIC KITCHEN CARNIVAL

The fine print in this advertisement points out the benefits of cooking with electricity, but a complete story is told in the large type and illustration. Electric utility companies are using this type of ad in support of the national LBE program.

definitely decided that we will use this word prominently in future advertising, as well as the theme, etc."

"In accordance with the request in your letter of July 13, we are enclosing samples of the uses we have made of the new 'Flameless' theme to date. We have more in the mill and will keep you supplied as it is produced."

"Enclosed are some of the recent newspaper, radio and TV ads, as well as a booklet in which (we have) used 'Flameless'. In checking back, I found that we have been using the words 'Flameless' and 'Flamefree' interchangeably for more than a year, but without any consistency. Future ads will probably all use the magic word."

"Incidentally — your merchandising-display kit made a big hit with our people. Further, 'Flameless' will play an important part in our Fall advertising (we're going to color in the Sunday supplement) . . ."

"We have been very impressed with the new energies which have been reflected in the current program."

"We have just started a 'Laundry Festival' in which we feature "Flameless" electric water heaters. Accordingly, under separate cover we're sending you a package containing reprints of newspaper ads, radio spots, dealer display material, etc. Should you want to reproduce the newspaper ads, we'll gladly send you slick proofs. Our management has completely endorsed the word 'Flameless' and we are incorporating it in everything we possibly can."

Allies Like Program

Here are excerpts from letters from executives of industry allies:

". . . all departments where the message is applicable have agreed to use 'Flameless' in their advertising and promotional literature. This includes the home laundry department on dryers, and the dishwasher and disposal department on water heaters, and the range department on ranges. In addition, the electric comfort heat section is now and will in the future be featuring 'Flameless' electric heating in their promotional activities.

"As you have already noticed, RMDO (Residential Market Development Organization) advertising and promotional literature will utilize the term 'Flameless' in connection with the Medallion Home appliances and equipment to which the term is applicable."—*John F. Hippen, Manager, Advertising and Sales Promotion, General Electric Co.*

"First of all, we have definitely decided that our policy will be to cooperate with you in helping put across the idea ('Flameless') to the American public. Secondly, its use by Westinghouse would be on all product advertising where it applies as a sales feature, such as electric ranges, electric water heaters, electric dryer, and electric heating advertising. It would also obviously be used in our Total Electric Home advertising—particularly where we feature any one or more of these products. We have already started moving in this direction, and we used it in the Total Electric Home TV commercials which appeared during the Democratic and Republican Conventions."—*J. H. Jewell, Vice President, Westinghouse Electric Corp.*

"I can assure you that we welcome the opportunity to work even more closely with EEI and its worthy promotion program."—*Guenther Baumgart, President, American Home Laundry Manufacturers' Association.*

"I am delighted to see the impetus

PLANNING TO BUILD? Don't go astray!
Go flameless electric ALL the way!

ONLY
electricity
IS FLAMELESS
FUMELESS
FOOL-PROOF

go electric ALL THE WAY

HOUSE HEATING
WATER HEATING
COOKING
REFRIGERATING
WASHING-DRYING
AIR CONDITIONING
BETTER LIGHTING

Boston EDISON Company
HELPS YOU LIVE BETTER ELECTRICALLY!

Boston Edison Co. scored with this ad, directed to customers who were planning to build homes. The electric cord and stylized lettering drew attention.

that you people are putting behind the Live Better Electrically program. . . . I want to tell you right now that we also are anxious for a close and effective relationship with your good organization."—*William Wichman, Vice President, General Electric Co., General Manager, Hotpoint Division.*

Instructions to Cooperate

"As a result of this meeting and subsequent discussion, I have issued instructions to our advertising people to cooperate in every possible way with this program. This will include the use of the Gold Medallion Home 'bug' in all ads and sales literature possible, plus the use of the Live Better Electrically slogan and the 'Flameless' approach wherever possible for copy. It seems to us you have a very fine campaign going here, and you can be sure that Kelvinator will cooperate in every possible way."—*W. E. Saylor, Director, Advertising & Sales Promotion, Kelvinator Division, American Motors Corp.*

"We have been watching the development of the Live Better Electrically program with keen interest and admiration. It is a dramatic attempt to demonstrate to the public the customer benefits of an ever-increasing degree of electrical use. It is particularly fitting that the benefits of electrical heat are being portrayed so well.

"It might seem redundant to say that the National Electrical Contractors Association is solidly behind this dynamic industry educational and promotional effort and is taking important steps to assure that the contractors follow through."—*George B. Roscoe, Director of Public Relations, National Electrical Contractors Association.*

Comments by the Press

Here are some of the comments made in the nation's press regarding the new LBE program:

"A powerful new approach. LBE will be creating . . . a broadly expanded market for goods and services of the electrical contractor."—*Willian Stuart, Electrical Construction and Maintenance.*

NO FLAME!
NO FUEL!
NO FOOLIN'!

You've never seen anything like electric home heating. It requires no flame so there are no burners to clog, no pilot to worry about. No furnace to clean and inspect, no fuel storage to take up precious living space. No flues, chimneys, hot air registers or cold air returns, either. And no moving parts to get out of whack. Simple? You bet it is. Electric heating is as quick, clean and quiet as electric light. That's what we mean when we say, Electric Home Heating Means Look Ahead Living!

Electric heat costs less than you might think. If yours is an average-size home with storm windows, adequate insulation and weather stripping, it can be heated electrically for as low as $193.20 per year. Compare this with the cost of heating with any other fuel.

For complete information, contact the Illuminating Co. office nearest you or call Ashtabula, Wyman 7-6101; or Painesville, Elmwood 2-3345. No obligation, of course.

The Illuminating Company
ALWAYS AT YOUR SERVICE IN THE BEST LOCATION IN THE NATION

ELECTRIC HEATING!

Burnt match on this ad of The Cleveland Electric Illuminating Co. was the attention-getter. Again a complete story was told in the large type of the advertisement — "No Flame! No Fuel! No Foolin'! Electric Heating!"

"This national campaign will make a great impression on many people." —*Contractors' Electrical Equipment.*

"A bolt of lightning . . . The electrical people's new look . . ."—*Joseph Kaselow,* "Along Madison Avenue with Kaselow" *N. Y. Herald Tribune.*

"Electricity is making its move and the builder stands to profit by it."—*American Builder.*

"The electrical industry today opened its most determined drive . . ." —*Alfred Russell,* "Lines and Linage," *World Telegram and Sun.*

"A lively 'Live Better Electrically' program."—*Marilyn Hoffman, Christian Science Monitor.*

"Edison Electric experts believe a way has been found to help the harrassed housewives convince their husbands."—*Clair Cox, United Press International.*

"The home appliance industry is watching with interest moves underway by public utility groups, which should add to their volume of business."—*J. Louis Donnelly, Journal of Commerce.*

". . . with the (electric) utilities finally . . . getting down to some solid activity, everybody in the appliance business, directly or indirectly, will benefit. Meanwhile those companies directly interested in both fuels need not be the least bit distressed."—*Earl Lifshey* "If You Ask Me," *Home Furnishings Daily.*

"The hydronics industry has nothing comparable to this pre-selling approach. (Commentary on LBE campaign.) Now it becomes necessary to consider electric heat as a competitor of even greater potential . . ."—editorial comment, *Journal of Plumbing-Heating-Air Conditioning.*

"Now We Take Off the Kid Gloves and Sell," editorial in *Electrical World.*

why perspire--cook by wire...
with a flameless
ELECTRIC
RANGE
Warmer weather can mean real discomfort to the home-maker—especially when cooking is done by old-fashioned methods. In summer—in fact in any season of the year—the new and only really cool way to cook is with electricity.
Electric Cooking doesn't fling heat into the air—it concentrates on the job at hand. Accurately controlled cooking heat is transferred by direct contact from surface unit to utensil—almost none escapes into the atmosphere. And, because electric heat is flameless, oven heat is completely sealed inside six heavily insulated walls.
Our hot, humid summers here on the Gulf Coast make the coolness of electric cooking particularly attractive—and it's a bargain in better living, too—costs an average of only $1.60 a month. See your dealer and start living better—and cooking better—electrically.
HOUSTON LIGHTING & POWER COMPANY

Houston Lighting & Power Co. used this ad to attract customers to electric cooking during the hotter summer months of the yea .

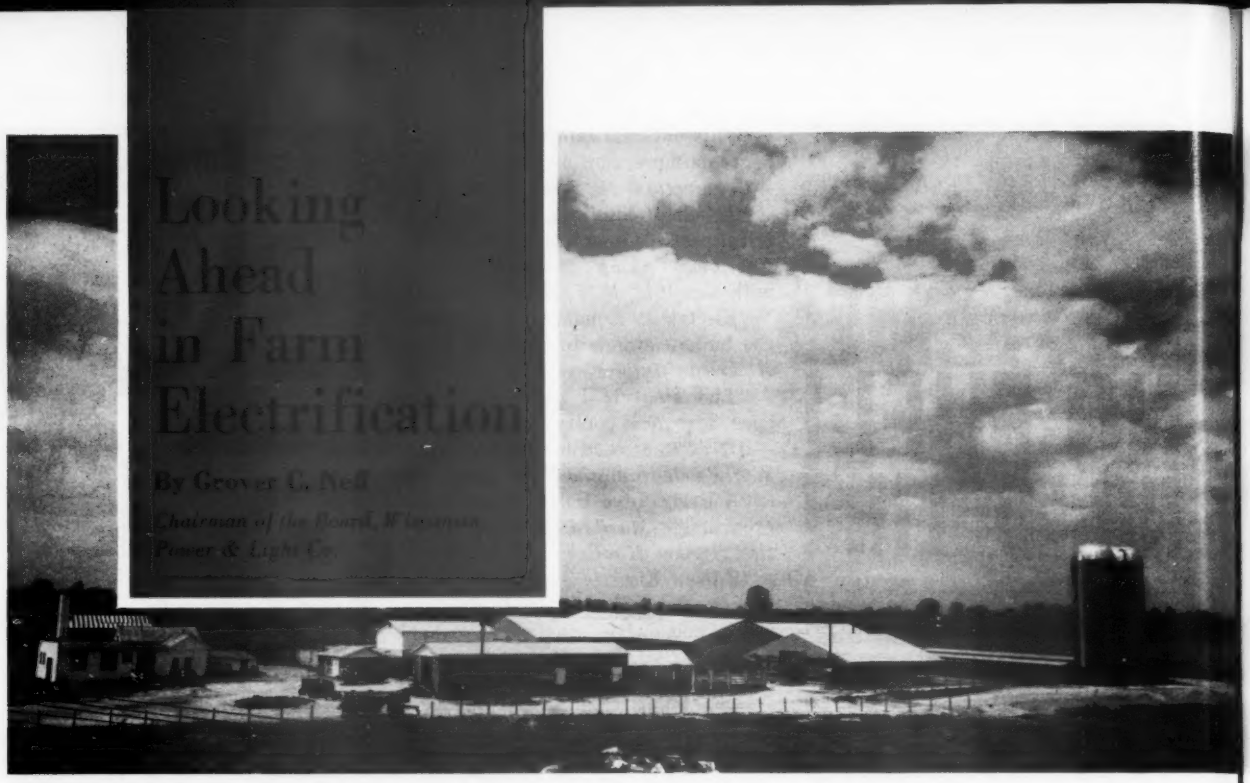
EEI to Exhibit at 1964-65 World's Fair

EDISON Electric Institute will be an exhibitor at the New York 1964-1965 World's Fair, Sherman R. Knapp, President of the Institute and President of The Connecticut Light & Power Co., has announced.

The Institute expects to have 50,000 square feet at the Fair, the maximum space permissible to a single exhibitor.

A committee of 17 electric company leaders has been appointed to develop plans for the industry's exhibit.

With E. R. Acker, President of Central Hudson Gas & Electric Corp., as Chairman, the Committee's members are: Harllee Branch, Jr., President, The Southern Co. Inc.; H. J. Cadwell, President, Western Massachusetts Electric Co.; J. E. Corette, President, The Montana Power Co.; E. H. Dixon, President, Middle South Utilities, Inc.; Willis Gale, Chairman of the Board, Commonwealth Edison Co.; E. L. Lindseth, Chairman of the Board, The Cleveland Electric Illuminating Co.; D. C. Luce, President, Public Service Electric & Gas Co.; E. J. Machold, President, Niagara Mohawk Power Corp.; J. W. McAfee, President, Union Electric Co.; Harold Quinton, Chairman of the Board, Southern California Edison Co.; R. G. Rincliffe, President, Philadelphia Electric Co.; W. H. Sammis, President, Ohio Edison Co.; Philip Sporn, President, American Electric Power Co. Inc.; J. B. Thomas, President, Texas Electric Service Co.; E. S. Thompson, Chairman of the Board, The West Penn Electric Co.; and J. J. Tuohy, President, Long Island Lighting Co.



ELECTRICITY has become an integral part of the American agricultural scene. Almost every farm in the nation is receiving electric service. We have reached the end of the first important phase in the process of rural electrification. What is the route that brought us to our present position and what are some aspects of the future of rural electrification?

Rural Electrification's Fullest Meaning

It seems that many people give the phrase "rural electrification" too narrow a meaning. It is not simply a matter of stringing lines from power plants to farms. Rural electrification, in its fullest sense, means electricity being put to its most complete use on the farms and in the homes of rural America. It will be complete only when the farmer is taking full advantage of all the many ways electricity can profitably serve him.

The nation's investor-owned electric companies have consistently approached the problems of rural electrification with this broader meaning in mind. From the time farm electrification became feasible, utility men have been working to help the farmer find increasing uses for electricity.

In thinking about the growth of rural electrification we ought to keep in mind how relatively young the electric utility industry really is. Thomas Edison developed his incandescent lamp only 80 years ago. In the eight brief decades since, the use of electricity has revolutionized many aspects of the life of our nation; first in the cities, then in the towns and villages, and now in the rural areas.

An address before the American Agricultural Editors' Association Convention, Memphis, Tenn., June 28, 1950.

As early as the 1890's, men in electric utility companies were showing interest in taking electric service to the farmer. However, the cost of manufacturing and delivering electricity was high and, at the same time, farm use of electricity was low. The result was that during the first two decades of this century, very little farm electrification was accomplished except in areas where water pumping provided the necessary load.

Even so, by 1920 more than 100,000 farms were being provided electric service. More important, 24-hour electric service was available in almost every city, town, and village. Furthermore, technology had been advanced so that the cost of manufacturing electricity had been greatly reduced. For the first time, on a national scale, electric companies were in a position to bring electric power out along farm lines radiating from the urban centers at rates low enough to fit into the farmers' economy.

NELA Formed Rural Service Committee

The stage was set — or rather, it appeared to be. The electric companies were ready and eager to begin a broad program of rural electrification. In 1921 the National Electric Light Association, the trade association of the electric companies, organized a Rural Service Committee to determine what was necessary to electrify rural America. I had the honor of being chairman of the committee from 1922 to 1927. We knew that if rural electrification was to be accomplished, the farmer would have to use electric service in such a way that the profit to him from such use would exceed the

over-all cost to the supplier of delivering such energy. We soon discovered that to do this, a whole new line of farm machinery would have to be developed, designed to utilize the advantages of electric power. Most of the farm machinery in those days was designed to be driven by gasoline engines, windmills, horses, or manpower. There needed to be great changes in farming methods before rural electrification could perform its full function on the American farm.

Problem Taken to Experts

Since we weren't experts in farming, we took the problem to some people who were. We approached the American Farm Bureau Federation, the National Grange, the American Society of Agricultural Engineers, the U. S. Department of Agriculture, and others. We asked them to join in a cooperative effort that would lead to the development of better, more efficient applications of electric service to farm operations. The organization that grew out of our discussions was known as the Committee on the Relation of Electricity to Agriculture.

The CREA, as it was usually called, was formed in 1923. It promoted and publicized research work in 27 agricultural colleges located across the country. As a result of its efforts, many new pieces of equipment designed for electric power were developed. Methods of doing many farm jobs were modified and changed. By 1925 the CREA was able to list 227 separate uses for electricity on the farm and 190 more uses for rural industries.

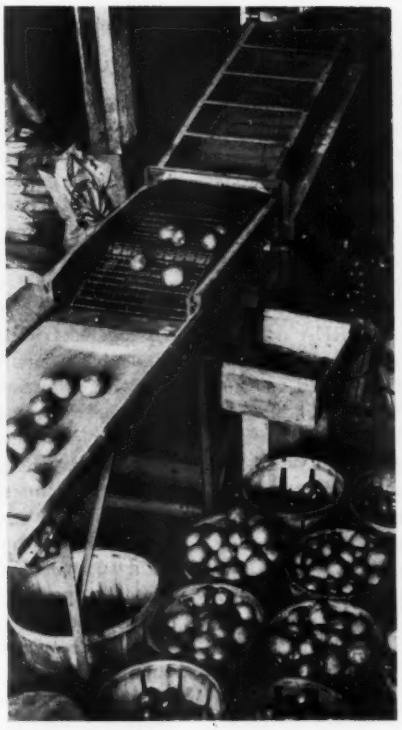
Rural electrification was picking up speed. The 1927 report of the NELA's Rural Service Committee pointed out that if the increase in number of electrified farms "continues at the same rate, there will be approximately 1,000,000 electrified farms in this country by the end of 1932; and, by 1938 . . . approximately 3,000,000, which is nearly . . . one-half the total farms in this country."

The same report noted that 57 electric companies had established rural service departments and 43 other companies were employing men trained in agriculture. The companies were hitting their stride. If it had not been for the great depression which began in 1929, I am sure the committee's estimate of 3,000,000 electrified farms in 1938 would have been realized.

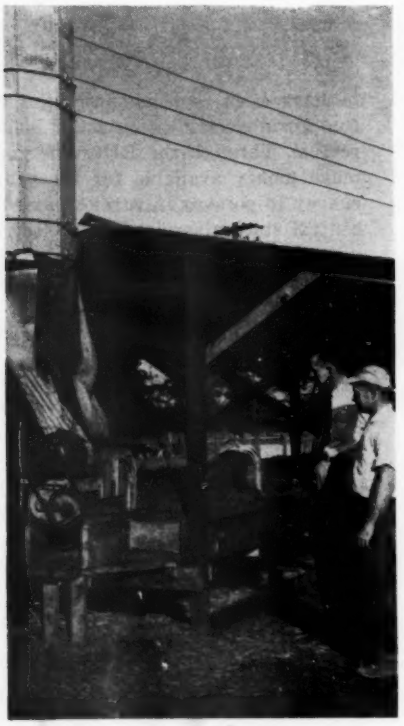
The fact is that the depression did slow down the expansion of electric service drastically, as it slowed down the advance of all other parts of the American economy. It was not until about 1935 that the electric companies and the farmers were able to get enough money to continue the job of rural electrification that had begun so promisingly. Even during the bleakest years of the depression, however, rural electrification was edging forward. Some 63,550 electrified farms were added to the total from 1930 to 1933.

In 1936, the Rural Electrification Administration was created. The initial impulse behind its creation seems

A 50-hp irrigation pump on a Southern farm is used to irrigate 50 acres of pasture land and 50 acres of cotton.



Six people at this electrically powered conveyer on a Massachusetts farm grade 200 bushels of tomatoes an hour.



Another use of electricity on the farm is illustrated by this automatic feeder on a farm near Birmingham, Alabama.

Automatic digger and topper speeds the harvest of huge Montana sugar beets, grown on fertile irrigated land. Electricity has been the major factor in reclamation of arid lands in the Western states of the U.S., through irrigation. By the end of 1958, some 97 percent of all farms in the country was receiving electric service. At the beginning of this year, the percentage had grown to 98.

to have been a decision by the Federal government that rural electrification would help a general economic revival. Through the REA, the government offered to make money available for the "furnishing of electric energy to persons in rural areas who are not receiving central station service." The electric companies, faced with a shortage of the capital needed to extend service farther into rural areas, made every attempt to cooperate.

At the request of Morris L. Cooke, the REA Administrator, the companies drew up a complete plan for expanding rural service, in which they agreed to borrow the full $100 million the REA had available for construction of rural facilities. "The program," a committee from the companies pointed out, "can be started as soon as funds are available and pursued as rapidly as the prospects are sold on the government's financing plan."

Since Wisconsin Power and Light Co. had built and was operating about 3,000 miles of farm electric lines and had many more miles of farm lines in the blueprint stage, I went to Washington, and met with Mr. Cooke and his staff. I applied for a loan for my company, of approximately one quarter of a million dollars, to finance the farm electric lines shown on blueprints I had with me. Mr. Cooke was told that this application would be followed with one for three quarters of a million dollars as soon as additional blueprints could be put in order. After numerous delays and excuses, the request for loans was refused.

Unfortunately, the REA program had become involved in politics and Mr. Cooke began an active campaign to promote the organization of rural distribution cooperatives and to loan REA money to them. The electric companies were left to revive their farm programs alone.

Since then, there have been two groups working to bring electric service to the American farmers — the investor-owned electric companies and the REA borrowers. There would seem to be no reason for any conflict between these groups but, unfortunately, there has been a good deal. Much of it has been fomented by people like the general manager of the National Rural Electric Cooperative Association, who appears to be an ardent advocate of government ownership of electric utilities and who uses this association to advance and support Federal legislation favorable to such government ownership.

Despite the unfortunate and unnecessary difficulties that have arisen between the two groups of power suppliers, rural electrification has advanced rapidly. By the end of 1958 some 97 percent of all the farms in the country was receiving electric service. Of these, 43 percent (2,018,000 farms) was being served directly by the investor-owned electric companies. In addition, about 40 percent of the electricity being distributed by

the REA-financed cooperatives was being supplied to them, at wholesale rates, by the electric companies.

In 1958 the REA-financed cooperatives were serving about 50 percent of all the farms in the country. Since the process of building new lines into territory without electric service is about over, this percentage probably should not change much in the future.

With few exceptions, the electric companies have cooperated with the REA so long as it was occupied with its legitimate and worthy function, building distribution lines to serve farmers that did not have electric service. It appears, however, that the REA is leaving — or has left — the area in which it was intended to operate. For example, according to the Report of the Administrator of REA, non-farm consumers accounted for more than half the total power sales of REA-financed cooperatives in 1958, and, according to the Director of Agricultural Credit Services, five out of six of the new consumers added to REA-financed power lines during 1959 were non-farm customers.

For many years the bulk of REA electric loans has been designated for distribution facilities. In 1959, however, over 17 percent ($30,707,281) of the year's loans was to be spent for the construction of generating plants and 19 percent ($34,107,116) went for transmission lines. Only about 62 percent of the total was earmarked for distribution facilities.

As of March 8, 1960, REA had 71 electric loan applications on hand. Fifty-seven percent ($134,974,247) of the money requested was for construction of generating plants and 28 percent ($65,375,884) for transmission facilities. It would appear that REA is rapidly moving into the development of generating and transmission facilities.

It seems that REA is now at a crossroad in its development. It must soon make some important decisions.

The REA was created for the express purpose of taking electricity to farmers who did not have service. It was also given authority to build generating plants where adequate electric service was not available at reasonable rates. Under pressure from the group which advocates government ownership of all electric utilities, REA has been led away from its original assignment. It has been led closer and closer to the position of that group which is trying to put the government further into the power business.

The REA and the REA-financed cooperatives are faced with a choice. They can move even closer to the government-ownership crowd, or they can move closer to the electric companies. They are free to move either way. I think the cooperatives would gain more by moving toward the electric companies.

In a majority of cases, the REA cooperatives operate in areas adjacent to areas served by electric companies.

The electric companies usually have large, efficient generating plants tied into large interconnected transmission systems. In most cases the companies have adequate capacities to serve their own customers and also to furnish at wholesale the requirements of the cooperatives.

A homemaker on a farm in upstate New York admires her all-electric kitchen. Such kitchens are common now in rural areas. The average farm uses more than 5000 kwhr of electricity a year, well above the national residential average.

As the demand for electricity increases and as the load on a cooperative's system grows, voltage drop problems are bound to develop. One way to overcome this difficulty would be for an electric company to supply wholesale power from existing transmission lines to two or more points in a cooperative's distribution system instead of to only one point. This would increase the capacity of the cooperative's distribution and would improve the voltage regulation. Many electric companies are doing this now, but it will become an increasingly attractive method of operation to the cooperatives as time goes on. It will make it possible for a cooperative to hold down its over-all investment in transmission and distribution lines and, in the end, will result in lower costs for the consumer.

Reliable Service Will Aid Customer

The consumer will also benefit from the reliability of service supplied over the existing company lines. In most cases, it will be possible for the company to supply power from any one of several existing plants, and often over one of several possible transmission lines. Moreover, the electric company's service and line crews will be available to maintain a high grade of service throughout the territory.

If the REA continues to finance the building of generating plants, as government ownership advocates desire, then it will also have to finance the building of elaborate and expensive transmission lines. These, in large measure, will parallel and duplicate existing company lines. One of the first lessons the electric utility industry learned during the first years of its development, and which has been accepted by most of the state governments, was that unnecessary duplication of facilities is wasteful, expensive, and undesirable. Building REA-financed generating stations with connecting transmission systems in areas where service can be obtained from existing plants and over ex-

isting transmission lines is clearly wasteful. The extra costs will have to be paid by someone; and that someone will be either the consumer or the taxpayer.

In the past, REA has often tried to lower the wholesale price of electricity paid by the cooperatives by threatening to finance the construction of a generating plant or transmission system in a particular area. This tactic has been successful in a number of cases. I submit, however, that carrying on business by threat is not likely to lead to sound or permanent solutions of the problems at hand.

Cooperatives are able to borrow money from the REA at 2 percent interest. If they could not do this, but had to borrow money at the market rate, and if they had to pay taxes on the same basis as the electric companies do, they would not be able to produce electricity from their own generating plants and transmission systems at a cost as low as the companies can supply it.

In nearly every state the rates electric companies are able to charge are closely regulated by state commissions. These rates must always be in line with the costs of supplying the service. From the consumer's point of view, as expressed through the commissions, the most important thing in building power facilities is to keep the *actual* costs down. If this can be done, the consumer will ultimately benefit. If unnecessary generating plants and transmission lines are built, then the actual costs will be higher than they should be. In time, either the taxpayer or the customer will have to pay for these extra costs.

If the REA-financed cooperatives will move closer to the electric companies and work with them, it will be possible for the cooperatives to get better service with less over-all expenditure for electric facilities. Of course, the advocates of government ownership of the electric industry will be doing everything they can to stop the cooperatives and the companies from coming closer together. If they succeed, they will be making it difficult for the customers of the cooperatives to receive electric service at the lowest actual cost.

From the point of view of the nation's power suppliers, whether company or cooperative, the future of rural electrification presents an exciting vista. Today, the American farm uses an average of more than 5,000 kilowatt-hours of electricity a year. By 1975, according to our present estimates, the American farm will be using about 15,000 kwhr a year—nearly three times the present total. Farmers have indicated intentions to purchase one billion dollars worth of electric farm equipment during the next five years alone.

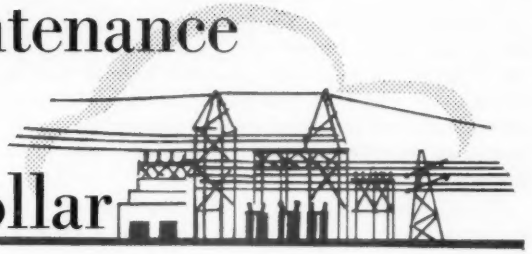
Growth of this magnitude is going to take continued efforts on the part of all those interested in rural electrification. The nation's electric companies are meeting the challenge by continuing research and development in the art of producing and delivering electricity; by development of new or improved applications of electricity to farm uses; and by carrying out extensive sales and advertising campaigns aimed at helping the farmer learn more about what electricity can do for him.

Throughout their history, the electric companies have continually sought ways to reduce the price and improve the standards of the electric service they provide. For example, the efficiency of steam generating plants has been improved to a point where today it

(Continued on page 300)

This brightly lighted farm of today is in sharp contrast to the farms of a few years ago when the only light was provided by kerosene lamps. The electric companies are meeting the challenge of rural electrification vigorously. They predict that in 1975 American farms will be using an annual average of 15,000 kwhr of electricity, or 68 billion kwhr each year.

Substation Maintenance and the Maintenance Dollar



By R. F. Stuart

General Superintendent of Substations,
Pacific Gas and Electric Co.

IN introducing the subject of maintenance and the maintenance dollar as applied to the Pacific Gas and Electric Co. system, it might be best to give some idea of the size of the service area, the people connected with the maintenance program and the amount of equipment involved. It should also be pointed out that there is no thought that any mentioned costs, or specific practices can be directly applied to another electric utility. We will be dealing with our approach to the maintenance problem in an effort to obtain the most from the maintenance dollar.

Data on Pacific Gas and Electric

The Pacific Gas and Electric Co. has a service area of about 90,000 square miles, supplied from some 822 substations having a total transformer capacity of approximately 15 million kva at the end of 1959. Forty-five stations are attended, three are supervisory controlled and the balance are automatic. The maintenance of these stations, plus about 3½ million kva in step-up capacity at steam generating plants, is decentralized to the substation maintenance forces of the 13 divisions of the company. The total force is comprised of approximately 245 men exclusive of supervisors. This same force also handles small construction jobs and considerable work such as testing, etc., which come under the operating categories. All major construction is accomplished by the general construction department.

A staff organization under the vice president in charge of electric operations has the basic responsibility of developing, controlling and issuing for execution through the division managers the policies, procedures, standards and programs governing electric operations and to audit them for compliance.

Maintenance is not the largest yearly expenditure faced by the electric utility company. We have found, however, and undoubtedly others will agree, that it is one of the costs most subject to abuse, and unless carefully followed can easily get out of hand.

Several years ago it became very apparent that if we were to keep maintenance costs to a minimum and be in a position to determine accurately our maintenance budget, we would first have to establish a base from which yearly costs could be determined.

Our first step was to investigate what the yearly maintenance expenditures had been in the past and to see if these costs bore any consistent relation to the capital invested in substation accounts. For this part of the study the four years prior to 1954 were selected; complete data were accumulated in maintenance expenditures for each year and on the total capital invested in substation accounts at the end of each year under review. This reference and all future references to capital invested in substation accounts include the step-up equipment associated with steam generating plants.

The results of this study looked quite encouraging as the findings indicated that over this four-year period maintenance costs only varied between the limits of 6.1 to 6.5 mills (average 6.3 mills) per dollar invested in substation capital accounts. These costs for maintenance included all charges for labor and material including the various overhead costs involved, but did not include any charges allocated to substation accounts for supervision. There was no delusion at the time that the 6.3 mill average was an ultimate figure; this only gave us a starting point or a reference from which to work and see if we could obtain a lower figure that would still be consistent with good maintenance.

Maintenance charges for 1959 amounted to 5.05 mills per dollar of capital invested in substation accounts (approximately $280 million) in spite of a 27 percent increase in wages and about a 22 percent increase in the cost of materials between 1954 and 1959. Actual costs for the year were 2 percent under the maintenance budget.

Over the last 10 years the trend line for increase in capital invested in substation accounts indicates a growth of approximately 8 percent per year. At the same time, the maintenance cost trend indicates an increase of a little under 6 percent per year. Any increase in divergence between these two trends will, of course, be an indication of how good a job we are doing. From all evidence to date, and provided normal conditions prevail, we feel that trends can be established from which maintenance expenditures can be estimated at least two years in advance with an accuracy within 2 percent of actual costs.

Having once developed a reference cost for station maintenance, the question that naturally follows is: what can be done to lower such costs or at least hold the line in this inflationary age? It requires a lot of soul searching and an open mind to determine if present maintenance practices of many years' standing are really necessary or correctly timed, whether methods being used are the most efficient, and whether maximum production is being obtained from the present maintenance organization.

Looking first at the maintenance organization, we might outline some of the things that have been and are being done in an effort to obtain maximum use of manpower.

- A basic two-man crew, normally consisting of an electrician and an apprentice or helper, has been adopted for all normal maintenance work. Crews may be combined or personnel borrowed where necessary. Large crews and their heavy trucks have been eliminated, resulting in a more flexible and efficient organization.

- A standard body on a ¾-ton chassis has been adopted for the substation maintenance crews. This body was developed after studies of various types of equipment used in the field, and its adoption has resulted in an efficient field "work-shop." By utilizing the same basic body design for troublemen and metermen, the only differences being in compartmentation, very substantial savings in body costs have been realized.

- The electrical technicians, whose duties primarily involve relaying and other specialized maintenance, work alone about half the time. On those jobs, where greater efficiency can be obtained by using two men, another man is assigned to help with the work and for training purposes.

- All special tools and the instruments necessary to expedite maintenance are provided or are available and, in addition, the gospel of labor saving devices is carried to the supervisor and the foreman in the field. This last item may appear redundant, but we have found quite a few foremen with the philosophy that they never needed any particular labor saving devices so why start now.

- Every effort is made to stress work programming to obtain more efficient use of manpower. There are some supervisors and foremen who may excel in their work but who fail to set up a program that will obtain maximum work output from the crews under their direction. When these cases are encountered a point is made of showing these individuals the need for programming, how it will make their job easier and how it can be accomplished using a relatively simple two-card system. One card might be called the "station card" on which is listed the various pieces of equipment, the maintenance interval, date of last maintenance and date maintenance is due. The second, smaller card covers individual pieces of equipment and is kept in a working file under the date that maintenance is due.

- Man-day standards have been established covering the majority of the equipment maintained and tested by electrical technicians. These standards were not the result of a time motion study of a particular job due to the many variable factors associated with the maintenance and testing of specialized equipment. They do, however, represent the average time required for certain repetitive procedures and were derived by working closely with field personnel. Allowances have also been made, on the basis of man-days per year, for certain nonrepetitive work performed by technicians, such as emergency repairs, etc. Again this is an average based on past experience. Similar man-day standards are now being set up for electricians. Standards of this type have proved very helpful in determining manpower requirements in alerting the supervisor as to what he should expect from his work force.

Maintenance Practices and Timing

There are maintenance practices for certain specific equipment and the timing for such maintenance. Time intervals between maintenance periods have been, for the most part, materially extended over the past 10 years, and present experience would tend to indicate that some further extensions could be called for in the future.

In the following outline it will be noted that several items are properly chargeable to operating accounts. In conjunction with tests and inspections, however, it becomes necessary, in many cases, to accomplish some maintenance. Due to the close interrelation, scheduled tests and inspections have been grouped with maintenance.

- Oil and Air Circuit Breakers
  1. At intervals not to exceed six months, each circuit breaker is inspected externally and the operating mechanism inspected, serviced and tested twice from the breaker control handle.
  2. All new circuit breakers are inspected externally and internally in the 6-to-12-month period subsequent to the date of installation.
  3. At intervals not to exceed 2½ years, contact resistance tests and contact parting time tests are made.
  4. At intervals not to exceed five years, each breaker is overhauled. At this same time a time distance analyzer is used on the 110-kv and 220-kv breakers.

5. All breakers are scheduled for overhaul when the aggregate of the units assigned for operations under fault conditions reaches 100, regardless of the date of last overhaul.
6. Breakers with known poor performance records are overhauled on the basis of past experience.

- Step Type Regulators
  1. An external inspection and a check of over-all operation are made on a monthly basis.
  2. An inspection of motor controls, contact-making voltmeters, limit switches and auxiliary relays, including timers, is made on a yearly basis.
  3. The tap changer compartments of all new regulators are opened up and an inspection made in the 6-to-12 month period subsequent to installation.
  4. The tap changers and tap changer mechanisms are overhauled every five years or every 250,000 operations, whichever occurs first.
- Induction Type Regulators
  1. An external inspection and check of over-all operation are made on a monthly basis. Lubrication of older types is accomplished at this inspection.
  2. An inspection of contact-making voltmeters and external auxiliary relays and switches is made on a yearly basis.
  3. Present experience indicates that induction regulators should be untanked and overhauled on a 20-year base.
- Transformers—No regularly scheduled maintenance. Inspections only. Where transformers are equipped with LTC the same schedule is followed as for step type regulators.
- Synchronous Condensers—Hydrogen Cooled
  1. Exciter compartment opened up each six months for inspection, cleaning and any necessary repairs.
  2. Complete condenser is overhauled every three years.
  3. Mobile vacuum pumps are used to evacuate hydrogen gas before overhaul and air following overhaul.
- Relays
  1. All protective relays are scheduled for a secondary test at 2½ year intervals and for such maintenance as may be found necessary.
  2. All protective relays are scheduled for an over-all test and general maintenance at five year intervals.
- Bushings

  Except for a group of bushings in the 115-kv and 196-kv class of one manufacturer, no scheduled test has ever been set up for bushings. Failure experience indicates no need for scheduled testing.
- Meters and Instruments—Meters and instruments, indicating or recording, used for determining bank, circuit or machine loading, are scheduled for testing at five year intervals.
- Insulating Oil
  1. Dielectric tests of insulating oil in transformers, regulators and oil circuit breakers are made at two year intervals.
  2. Acidity tests of insulating oil in transformers and regulators are made at intervals not to exceed five years. When acidity reaches 0.3, tests are made at yearly intervals.
- Oil Handling Systems — Fixed insulating oil handling systems are no longer provided on new substation construction. The program was started about four years ago to eliminate the high maintenance costs associated with such systems. Mobile tankers of many sizes are provided and used in lieu of fixed piping. With the larger size tankers (3500 gal.) built-in filter presses and transfer pumps are standard equipment. The use of recently developed "pillow tanks" has been justified.
- Painting: With the exception of some exterior building work all painting is accomplished by the paint crews of our general construction department. All repainting is on the basis of appearance or the weather-tight integrity of the building. On equipment and structures repainting is on the basis of accomplishing such work at that period when the surface can be readily prepared by light wire brushing. Costly sandblasting expenditures are avoided. Spot painting is used where the major surfaces appear intact.
- Landscaping—Maintenance of landscaping is largely accomplished under contract and has worked out very satisfactorily. There are approximately 90 stations which require landscape maintenance.
- Written Aids for Maintenance—The maintenance of most major equipment is covered by substation bulletins, usually outlining basic procedures which must be supplemented by the manufacturers' instructions. In the case of high voltage oil circuit breakers, step-by-step procedures have been prepared for some types and are being prepared for others. Such aids definitely cut down on the time spent in searching through many pages in manufacturers' instruction books.

So much for our maintenance program. We have no fixed ideas that we have all the answers or that we cannot do a better job. On the other side of the ledger, based on recent experiences, we feel that equipment manufacturers could also help by doing a better job on inspections and quality control. Corrections for poor workmanship at one installation alone are going to add about $33,000 to our maintenance costs this year.

We also feel that there is a need for improvement and simplification in many types of equipment being furnished today. Specifically might be mentioned oil circuit

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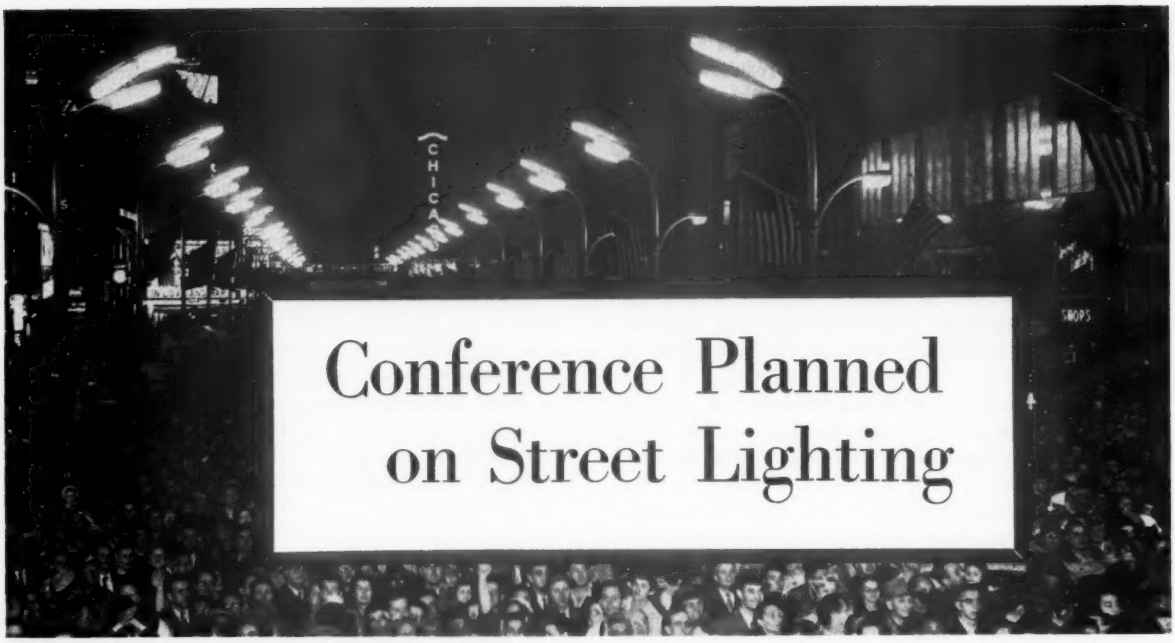


Conference Planned on Street Lighting

THE Second Street and Highway Lighting Conference will be held Oct. 19-20 at the Ambassador Hotel in Chicago, L. H. Lingemann, Manager, Municipal Sales Department, Duquesne Light Co., and Chairman, EEI Street and Highway Lighting Committee, has announced.

A roster of important speakers from within and outside the electric utility industry will be featured at the conference, which will be sponsored by the EEI Street and Highway Lighting Committee, *Electrical World* magazine, and the Street Lighting Section of the National Electrical Manufacturers Association.

The preliminary program is as follows:

Sherman R. Knapp, President, The Connecticut Light & Power Co., and President, Edison Electric Institute—"A Close Look At The Street and Highway Lighting Market."

R. W. Johnson, Chairman of the Board, American Council to Improve Our Neighborhoods—"The Part of Street Lighting in Urban Redevelopment."

W. W. Sproul, Jr., Vice President, General Products Group, Westinghouse Electric Corp.—"The Future for Street Lighting."

Edwin Vennard, Vice President and Managing Director, Edison Electric Institute—keynote speaker.

Robb Winsborough, Vice President, Public Relations, Middle West Service Co.—"The Public Relations Aspects of Street Lighting."

Mayor Richard Daley, City of Chicago—welcome.

T. L. Sharkey, Manager, Rates and Pricing Department, Ebasco Services Inc.—"Rates and Regulatory Problems of Street Lighting Service."

There will be a panel discussion of the "Need for Cooperation Between Utilities, Manufacturers and Municipal Government."

- Utilities' Viewpoint—C. E. Waldron, Street Lighting Advisor, Niagara Mohawk Power Corp.
- Manufacturers' Viewpoint—J. S. Smith, Manager Outdoor Lighting Department, General Electric Co.
- Municipal Viewpoint—R. J. Sprungman, Traffic and Street Lighting Engineer, City of Minneapolis.

Mrs. D. O. Arnold, Second Vice President, General Federation of Women's Clubs—"Shadow and Substance."

E. C. Powers, Educational Director, Street and Highway Lighting Safety Bureau—"Materials Available to Meet Educational Needs."

W. H. Edman, Vice President in Charge of Street Lighting, Holophane Co., and Chairman, Illuminating Engineering Society Subcommittee on Standard Practice Revision—"Requisite Roadway Lighting—Present and Future."

L. M. Johnson, Commissioner, Department of Streets and Sanitation, City of Chicago—"The Chicago Story."

Stacy Standley, Product Manager, Lighting, Line Material Industries—"The Need for More Highway Lighting."

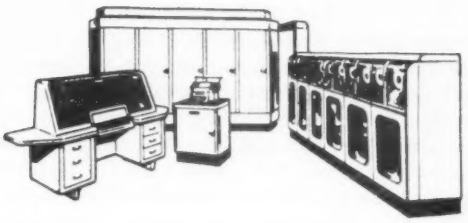
Electrical World Street and Highway Lighting Survey—J. D. Damon, Assistant Editor, *Electrical World*.

E. E. Gayman, General Supervisor, Community Development Section, The Cleveland Electric Illuminating Co.—"The Residential Market for Street Lighting."

J. A. MacCracken, Street Lighting Engineer, New England Electric System—"Economics of Street Lighting."

Successful street lighting programs will be discussed by G. K. Glass, Street Lighting Engineer, The Detroit Edison Co., and R. L. Sawiyer, Chief Illuminating Engineer, Pacific Gas and Electric Co.

Relationship of Internal Auditing to Electronic Data Processing



By H. R. Symes

Chairman, Subcommittee on Electronics, EEI Internal Auditing Committee

INTERNAL auditors are being required to re-evaluate their audit functions to meet their responsibilities as more companies in the utility industry plan, develop and install electronic data processing equipment.

Although the principal audit objectives remain unchanged, the procedures to perform the audit and the system of internal controls are materially affected by EDP systems.

An indication of the interest of internal auditors in the industry that they exercise the proper initiative and imagination in the development and utilization of EDP was illustrated at a recent meeting of the AGA-EEI Internal Auditing Committee. At this meeting, attended by 70 percent of the members, the Subcommittee on Electronics of the Internal Auditing Committee answered members' questions for several hours. The panel consisted of the following:

H. L. Holmberg, Commonwealth Edison Co.; J. J. Cruise,* Consolidated Edison Co. of New York, Inc.; H. R. Symes, The Detroit Edison Co.

The panel received some 40 questions from AGA and EEI members of the committee in advance of the meeting. To expedite the presentation the panel combined similar questions and prepared single answers. The questions received dealt with the internal auditors' participation in the development of electronic data processing systems, the extent EDP knowledge is required of audit personnel, and the effects of EDP installation on internal audit staffs. The panel prepared the following general reply to these questions.

Participation in the Original Programming: Among the several AGA-EEI companies with over a million customers that presently have in operation or are in the process of programming for large-scale electronic data processing equipment, internal auditors have assigned personnel to the programming staff. The comments received indicated that all believed it desirable for the internal auditor to participate in the development of the original program. Similarly, in the survey made by the Institute of Internal Auditors, it was the opinion of most internal auditors that participation in the program development gave the internal auditor an understanding of what the machines can accomplish and how controls may be built into the program.

Probably the most impelling factor for internal auditors to participate in the advance planning of any procedure, in which electronic high speed machines are to be utilized, is the time required to program the operations. The time estimated to prepare for the adoption of the high-speed machines is monumental. Most companies have estimated the time required to program the various operations and prepare sample runs for de-bugging and conversion of the records at anywhere from 20-50 man-years. The time required to program, of course, varies as to the volume of work integration of numerous records into a new system and the nature of the application, i.e., payrolls, customer billing.

Waiting Impractical

In these circumstances it readily can be appreciated that it would be impractical—and perhaps impossible—for the internal auditor to await the completion of the programming before reviewing the procedure. For, if the auditor desires to make necessary changes in the procedures after the operations have been programmed, it may take considerable time and expense to reprogram.

Thus, among the several companies, it has been beneficial to have auditing personnel work with the procedural staff to assist in the formulation of revisions that may be required in policies, practices and procedures, so that the program established for the electronic machines has satisfactory controls over operations.

Technical Knowledge of the Machines: As with any innovation, the internal auditor has to ascertain to what extent he should acquire a technical knowledge of the operations that are subject to audit. The fact that electronic data processing machines will be utilized on many operations that are subject to audit will re-

*P. M. Murdoch, Southern California Edison Co., represented Mr. Cruise.

quire the auditor to become acquainted with electronic machine operations. A general knowledge of the machines is desirable for the auditor to appraise an electronic procedure. It does not appear to be a necessity for the internal auditor to become completely trained in the mechanics of programming for electronic equipment. However, greater efficiency should result if at least one member of the audit staff has considerable experience in system design and programming.

Case History of Companies: At Detroit Edison the internal auditing department participated in the development of the two systems now on IBM 705—revenue accounting and employee data and payroll system. In the revenue accounting area one auditor thoroughly familiar with these operations was assigned to the programming staff. The auditor was placed in charge of the group which developed the controls to the system. This, of course, was very beneficial to both the programming and internal auditing since auditors would be primarily concerned with the controls. Programming, in turn, would be assured that the auditor would establish satisfactory controls. In the development of the employee data and payroll system, the supervisor in charge of these audits was assigned to the task force. In this case the task force outlined the payroll procedure. Programming which was represented on the committee took over the detail programming job. All significant proposed changes were submitted at meetings which the auditor, public accountants and other management personnel concerned attended. At these meetings overall policies, procedures and required controls were completed.

At present a feasibility study is in progress for the development of a new material and supplies procedure utilizing EDP. The procedures and methods department is supervising a task force to which an auditor will be assigned.

Audit Staff Takes Course

At Consolidated Edison some members of the audit staff took the programming course offered by the computer manufacturer with those destined to be permanent programmers, and worked with them in the application for approximately two years. In addition, the weekly staff meetings before and during the conversion period were attended by auditing members, as well as the public accountants, and all significant changes proposed in the program were submitted to the auditors for review to assure that the existing controls would be effective under the new system.

At Commonwealth Edison it is felt that personnel who audit EDP operations should be exposed to some training of the hardware and programming, including courses offered by computer manufacturers. It is suggested that such personnel be exposed to at least one of the basic courses for familiarization with basic terminology and the approach to the problem of adapting accounting systems to the computer. A two-to-four-week course probably will be adequate to cover the general information necessary to approach a problem intelligently. Obviously, such personnel should be thoroughly familiar with the accounting area to be reviewed. Generally, the scope of a computer system is so great, and the operations are so interrelated and complex, that anything less than a complete understanding of the over-all system will produce ineffective audit results.

Need for High Caliber Personnel Increased

Experience at Commonwealth Edison has shown that adoption of a computer system has increased the need for higher caliber audit personnel. The need arises from the requirement that the audit staff evaluate the propriety and accuracy of input and output data and to some degree appraise clerical performance in applicable departments.

Conclusions: The auditor should, as a minimum, participate in the development of the program as follows:

- He should at least have some general knowledge of the operation of the hardware of the computer which is to be utilized. He should know its general functions and its capabilities.
- He should be or become familiar with the present system applicable to an activity and be thoroughly informed about the framework upon which the proposed computer program is to be developed.
- He should have a complete understanding of the control measures incorporated in the program and the hardware.

From the experience of the respective companies represented on the panel, it may be concluded that the internal auditors assigned to these task forces can materially assist in the development of the program, especially the controls, and also acquire considerable knowledge of the new EDP system. Through this process audit personnel can be developed who can be assigned the responsibilities for the training of other auditing personnel and, most importantly, the development of the audit program to cover the new EDP system.

With these general remarks in answer to the 12 questions, the panel presented specific answers to other remaining questions submitted.

Question: In those companies utilizing large-scale computers in their revenue accounting system, what method is used to assure auditors that accounts are set up and billed for all meters in service?

Answer: In regard to meter control, a program is now being developed at Consolidated Edison whereby a count of the meters in each ledger will be made at the time the master file passes through the computer, and that count will be compared with the number of meters which should be in the ledger as shown on the meter control. The result of this comparison will be announced on the console typewriter. This information can be reviewed by the internal auditor.

The controls employed by Commonwealth Edison to assure billing for all meters include certain measures specifically designed for control purposes and other measures that are inherent in the computer record-

keeping system. Before describing these control measures, it may be advisable to discuss the system briefly.

All receivable records are maintained in the general office on computer tape for billing and bookkeeping purposes. In addition, a customer service file is maintained on IBM cards in each division headquarters for the meters in service in the respective divisions. These card records are used to produce meter-reading cards and to process meter orders only. Changes in card record data resulting from meter orders are reproduced on instruction cards which are forwarded to the computer area for revision of the tape record. Thus the system includes an important inherent control aspect in that every meter record on tape in the general office has a supporting card record in the division.

Control Measures for Billing

The following control measures are used to assure billing for all meters in service:

- The meter department holds a follow-up record for all meter installations completed in the field. Upon completion, the installation order is forwarded to the division headquarters for production of a customer service card for the meter. From this record, two cards are reproduced. One is forwarded to the computer area to establish billing records on tape and the other is forwarded to the meter department to assure that billing records have been established.

- Meter-reading cards are produced from the customer service cards. After meters are read, the reading cards are forwarded to the computer area for billing. In the event there is no computer record for a reading card, a memorandum is produced and forwarded to division headquarters for investigation to assure that a computer record will be established if necessary.

- A statistical record is prepared bi-monthly by the computer, showing meter installations and removals. This record is forwarded to the meter department to verify that the installations and removes as shown by the computer agree with the meter department records.

- Periodically a complete mechanical audit is made to verify that the meters in service, as shown on the computer tape record, agree with the meters in service as shown by the meter department records.

Question: What control measures are there to assure that all external entries such as meter orders, customer account adjustments, credit refunds, transfers, etc., are properly reflected on the computer records?

Answer: Most of the external documents are prepared by the respective commercial departments within each of the divisions of the Commonwealth Edison Co. These documents are controlled as follows:

- A transmittal is used in forwarding meter orders to the computer area and such transmittal indicates the number and type of documents being forwarded. All other external entries are sent in without a transmittal.

- Computer personnel verify that the number of meter orders received agree with those shown on the transmittal.

- External entries other than meter orders are separated by type of transaction by computer personnel and an adding machine tape is prepared to determine the total amount each day of the various types of transactions.

- Such external entries are then key punched and key verified. A listing is prepared from the cards and the totals thereon compared to the adding machine totals.

- Having established the accuracy of the card data, the cards are introduced into the computer tape system. The amounts introduced to the system are subsequently verified by comparing the computer total printed out against the original adding machine tape totals for the day.

- External entries are reviewed by computer personnel for proper authorization, etc., before such documents are introduced into the computer system.

- The internal audit staff scans such entries daily to determine their propriety.

Question: What is the scope of built-in controls? How can the internal auditors utilize EDP installations in their audit work?

Answer: At Consolidated Edison there are a number of checks that are now being performed which can be utilized by the internal auditor. Here are a few examples.

In the change edit run some of the checks consist of a daily count of ledgers on master file to assure no loss of file, input item count balanced with output item count, and ledger number checked against master index to assure a valid number.

In the file maintenance, and billing run, for example, before posting a change or bill order, inspections are made to insure: that the service indicated exists in the master file; that the change is consistent with the activity code (a turn-off for a service already turned off is rejected); and that the to-date of the last bill rendered is not later than the to-date of the new bill order.

During processing and immediately after processing a change bill order or cycle reading, some checks are made to insure: that when a reading of four significant digits is received the dial code indicates a four-dial meter; that there is no hold code on cycle card before processing; and that a cycle reading card is present for every account on cycle and an account is on the master file for every cycle reading card.

Finally, the consumption for the current period is compared with previous periods to detect unusually high or low usages.

Question: How often do the auditors evaluate the systems, procedures, controls and programming logic?

Answer: At Detroit Edison auditors evaluate the system on a continuing basis. Audits of the billing procedure, cash processing and reviews and examination of adjustments to the accounts are made at varying

(Continued on page 303)

Looking Ahead in Farm Electrification

(Continued from page 292)

takes less than one-fifth the amount of coal to produce a kilowatt-hour of electricity than it did 50 years ago. This fact takes on particular significance when we realize that about 80 percent of the electric power in the United States is generated from fossil fuels, particularly from coal.

We are fortunate enough to have large reserves of these fuels — enough to last for many years. But the reserves are not inexhaustible. Demands for electric energy are going to increase greatly, not only on the farms and in the rural areas, but in all parts of our economy. Eventually, a new source of energy will be needed to supplement fossil fuels. Nuclear fuels promise to be that new source.

26 Nuclear Projects

Today, 132 electric companies are participating in 26 nuclear projects which form an industry program aimed at achieving economic production of nuclear power. For rural electrification—as for the whole of the United States—this program promises to provide a continued abundance of the fuel sources needed to generate electric power. In its present state of development, nuclear power is more expensive than power generated in plants burning coal.

In many ways agriculture is in competition with the manufacturing industry. As industry increases its mechanization and automation, its profits increase and employees in such industry get more pay for their work. This affects less mechanized industry and even agriculture. Agriculture must mechanize and use automation to the same extent as modern industry before it can compete on equal terms.

To help bring more of the benefits of electrification to America's farms, power companies are participating in more than 200 research projects. It has been estimated that during 1959 alone, the electric companies contributed more than $500,000 to farm electrification research. Besides these activities the companies have developed a broad program of agricultural improvement.

They realize that the progress of rural electrification depends upon the prosperity of their farm customers. Individual companies, often working with agricultural colleges, are conducting research on the following: adaptability, production, nutritive value, fertilization, and water requirements of grass; spinach diseases; sprinkler irrigation on hybrid corn development; controlled environment for farm animals; use of electronic processing; control systems to carry through an entire production process and many other subjects.

Since 1923, the electric utility companies of Wisconsin financially supported and worked with the University of Wisconsin on research, trying to find new and better ways to put electricity to work on Wisconsin farms. In 1945, these same utilities purchased a farm near the city limits of Madison and made it available to the University of Wisconsin and financially supported the research work done by the University of Wisconsin on the farm. This work is continuing and farm electrification in Wisconsin is being helped and advanced very much as a result of this work.

One important way that farmers learn of the findings of these research programs is through the electric companies' sales and advertising programs. These programs do much to encourage the use of electricity on the farm. We are well aware of their activities in the past. What you may not realize is that the companies will be intensifying their efforts in this direction. The Edison Electric Institute's Farm Better Electrically program, for instance, plans to expand its activities as rapidly as possible. There will be a national advertising campaign, as well as provisions for coordinated local advertising activity, and a series of special events — all aimed at increasing awareness of the role electricity can play on our farms.

The electric companies realize that rural electrification, in its fullest sense, will only be accomplished when farmers are putting electricity to every profitable farm use. It was this point that the electric companies set as an ultimate goal years ago. It is this point that they are working to reach today.

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J. K. Horton

S. R. Knapp

J. C. Arnell

P. V. Hayden

William Ismay

Round Table Conference Held in Chicago

F. R. Rauch

THE 13th Annual Round Table Conference of the EEI Industrial Relations Committee, at the Drake Hotel in Chicago, Sept. 26-28, emphasized the cost of manpower, management's growing task, the employee as an envoy, and daily team work.

Four outstanding speakers from EEI member companies keynoted the conference, which had as its theme, "The Company and Its People Face the Challenge." D. C. Allen, Industrial Relations Manager, Public Service Electric and Gas Co., was Chairman of the Conference Committee. W. H. Senyard, Vice President and Director of Personnel, Louisiana Power & Light Co., and Chairman of the EEI Industrial Relations Committee, welcomed the electric utility industrial relations personnel in an address at the opening session.

Thirty-two experienced conference leaders from electric utilities directed the group discussions. Keynote speakers were: J. C. Arnell, Director, Industrial Relations, Consolidated Edison Co. of New York, Inc., who discussed "The Cost of Manpower"; William Ismay, Industrial Relations Manager, Arizona Public Service Co., "The Growing Task of Management"; P. V. Hayden, Vice President, The Connecticut Light & Power Co., "The Employee as an Envoy"; and F. R. Rauch, Vice President, The Cincinnati Gas & Electric Co., "Daily Team Work."

Three electric company presidents were scheduled to address the delegates at luncheon meetings. On Monday, Sept. 26, EEI President Sherman R. Knapp, who is President of The Connecticut Light & Power Co., addressed the conference. J. K. Horton, President of Southern California Edison Co., spoke on the following day, and S. L. Drumm, President of West Penn Power Co., was the speaker on Wednesday, the last day of the conference.

A special feature was added to this year's conference—a panel presentation Tuesday evening, Sept. 27, on "The Manpower Challenge of the Nuclear Plant." Mr. Allen was moderator, and panelists included H. Hoyt, Superintendent of the Dresden plant of Commonwealth Edison Co.; G. G. Oldham, Superintendent of the Shippingport plant, Duquesne Light Co.; I. L. Wade, General Superintendent of Generating Stations, Commonwealth Edison Co.; and W. F. Wirth Health Physicist, Duquesne Light Co.

Group conferences were scheduled for 2:15 p.m. and 4:15 p.m., Sept. 26; 9:30 a.m., 11:30 a.m., 2:15 p.m. and 4:15 p.m., Sept. 27; and 9:30 a.m. and 11:30 a.m., Sept. 28.

Conference leaders were as follows:

"The Cost of Manpower"—J. J. Foley, Assistant Vice President, New England Electric System; W. H. Joiner, Manager, Industrial Relations, Georgia Power Co.; D. M. Mitchell, Coordinator, Labor Relations, Union Electric Co.; R. H. Pearson, Director, Employee Relations, Hartford Electric Light Co.; Eliot Priest, Director, Industrial Re-

lations, Public Service Co. of New Hampshire; G. E. Rodman, Supervisor, Education and Training, Commonwealth Edison Co.; L. A. Rushmore, Industrial Relations Manager, Long Island Lighting Co.; J. A. Talley, Vice President and Comptroller, California Electric Power Co.

"The Growing Task of Management"—L. D. Collins, Director, Employee Relations, Central Power and Light Co.; C. S. Green, Executive Assistant, New Orleans Public Service Inc.; W. M. LaSalle, General Coordinator of Personnel Relations, Ohio Edison Co.; L. F. McCrocklin, Administrative Assistant, Louisiana Power & Light Co.; F. C. Prasse, Manager, Personnel Department, The Cleveland Electric Illuminating Co.; T. J. Regan, Jr., Vice President, Employee Relations, Boston Edison Co.; P. A. Rice, Manager, Personnel Department, West Penn Power Co.; J. G. Schmidt, Personnel Director, Interstate Power Co.

"The Employee as an Envoy"—J. J. Ehlinger, Personnel Manager, Eastern Division, Niagara Mohawk Power Corp.; N. L. Geer, Industrial Relations Manager, The Connecticut Light & Power Co.; W. E. Gordon, Manager, Industrial Relations, Portland General Electric Co.; J. E. Kane, Jr., Manager, Personnel Department, Baltimore Gas and Electric Co.; J. M. McConnell, Employment Manager, Rochester Gas & Electric Corp.; W. E. Reeder, Assistant to Manager of Personnel Department, Texas Power & Light Co.; R. E. Schwab, Manager, Employee Relations, The Detroit Edison Co.; R. H. Sessions, Personnel Director, Idaho Power Co.

"Daily Teamwork"—J. F. Cheston, Personnel Staff Assistant, Potomac Electric Power Co.; A. L. Clark, Personnel Director, Virginia Electric & Power Co.; C. W. Cornforth, Assistant Industrial Relations Manager, Public Service Electric and Gas Co.; M. H. Fox, Labor Relations Manager, British Columbia Electric Co., Ltd.; C. J. Hartwig, Administrator, Employment and Training, Northern States Power Co.; J. S. Newbold, Personnel Director, Carolina Power & Light Co.; H. V. Potts, Vice President, Columbus & Southern Ohio Electric Co.; E. C. Stolper, Assistant to President, and Personnel Director, Wisconsin Power & Light Co.

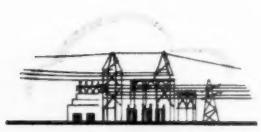
'Lighting for Industry' Booklet Available

A NEW booklet on lighting for better seeing in industry, "Lighting for Industry," has been released by the Better Light Better Sight Bureau, C. D. Hollister, General Sales Manager Niagara Mohawk Power Corp., and Chairman of the bureau, has announced.

Addressed to plant executives, "Lighting for Industry" is designed to supplement the efforts of utility power salesmen in gaining acceptance for the new higher lighting levels recommended for industry. Included in the new booklet, which was prepared by BLBS Bureau's Lighting Information Committee, are the new recommended levels; an explanation of the IES-sponsored Blackwell research program which led to the new levels; a discussion of the quality factors in plant lighting; an explanation of the specific benefits which can result from a properly lighted plant; and 10 illustrated "case histories" showing how and where these lighting benefits paid off for the users.

It is a 16-page, 8½ x 11-inch, two-color booklet which carries a BLBS Bureau form number B-570. The booklet is available from the bureau at 25 cents each in lots under 100; $20 per hundred in quantities up to 1000; and $180 per thousand in quantities of 1000 or more, FOB New York.

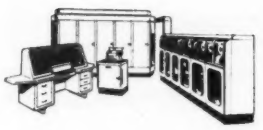
The Better Light Better Sight Bureau is located at 750 Third Ave., New York 17, N. Y.



Substation Maintenance and the Maintenance Dollar *(Continued from page 295)*

breaker mechanisms, relays and LTC mechanisms. Along somewhat similar lines, our engineering group is presently setting up proposed specifications for hookstick-operated disconnects. We will be working closely with this group and the manufacturers, and there is every reason to believe that aside from complying with AIEE Standard #22, we can also obtain a disconnect that will be maintenance-free and work properly over the years when called upon to do so. Present plans are to expand this program to group-operated air switches as soon as time permits.

We sincerely believe that an interchange of ideas on substation maintenance can be most helpful in keeping costs to a minimum. We are continually trying to get the most from the maintenance dollar. We welcome comments, criticism and experiences to the end that all of us may benefit from the experience of others.



Relationship of Internal Auditing and EDP

(Continued from page 299)

times throughout the year so that an appraisal of the system is being made continually. Certain data produced by the EDP are used externally to verify accuracy of internal data, i.e., confirmation statements (IBM cards) are produced by EDP system. These are mailed to customers to confirm unpaid accounts. The EDP payroll system produces weekly reports showing all variations to a normal payroll, which are reviewed and examined by department heads.

Thus the EDP system procedures and controls are evaluated, first of all, on a continuing basis by the departments responsible for the operations, and secondly, by audits of various operations on a continuing basis.

Question: Do companies using the electronic data processing system audit the EDP section as such, or do they perform their audits in connection with general audits of accounts receivable, purchasing, payables, payroll, etc.?

Answer: At Detroit Edison each function is audited separately, i.e., accounts receivable, payrolls. The audit consists of a complete appraisal and examination of the whole activity which includes many external functions, along with the EDP processing operations. I think that under our committee's present concept of operational audits the electronic data processing operation would be only a part of the whole function under audit.

The foregoing is representative of only some of the 40 questions submitted to the panel by internal auditors.

Here are the conclusions reached by the pioneers of auditing electronics in contemplating the questions submitted.

Participation in the Development of EDP Program

It is strongly advocated that internal auditors participate, along with personnel from accounting, electronic data processing, and other concerned departments, in the development of the program, particularly for the purpose of establishing necessary controls of the EDP system.

Technical Knowledge of EDP

A general knowledge of EDP hardware equipment is desirable in order for the auditor to appraise electronic procedures. To accomplish this, personnel of several companies took courses offered by the computer manufacturers. It is also believed that it is not necessary for auditors to become completely trained programmers. This may be left to the programming staff. However, greater efficiency should result if at least one member of an audit staff has knowledge of system design.

Auditing EDP

As a consequence of the above activities, internal audit personnel are developed who can be assigned the responsibility for the training of the audit staff, development of the audit program to cover the EDP system and, most importantly, the utilization of EDP to perform audit operations at lower costs.

Lawrence Named Chairman of Sales Division

C. D. LAWRENCE, Vice President in Charge of Sales for the New England Electric System, has been appointed Chairman of the Sales Division Executive Committee of Edison Electric Institute for 1960-1961, Sherman R. Knapp, President of EEI and President of The Connecticut Light & Power Co., has announced.

Mr. Lawrence will preside over the 56-member committee which will direct the activities of the other 18 committees of the Sales Division during the coming year. These committees, served by more than 300 sales executives representing the nation's 196 investor-owner electric utilities, have been organized to help promote the use of electricity on the commercial farm, and in industrial and residential markets.

Mr. Lawrence received a mechanical engineering degree from Cornell University in 1923. After two years with the former Scranton Electric Co., he served with Central Hudson Gas & Electric Co. until 1929 when he joined New England Power Service Co. He was made head of the company's industrial and commercial departments in 1934, and 10 years later was appointed vice president in charge of sales.

Mr. Lawrence was previously chairman of EEI's Commercial and Industrial Policy Subcommittee, and was appointed chairman of the Sales Division Executive Committee to replace R. G. MacDonald, former Vice President of Marketing for West Penn Power Co., who recently was elected President of Potomac Edison Co.

Public Service E & G Plans Push Button Electric Power Plant

PLANS for an extensively automated electric power plant have been announced jointly by Public Service Electric and Gas Co. and Westinghouse Electric Corp.

The 342,000-kilowatt turbine generator unit is now under construction as an additional unit at Public Service's Sewaren Generating Station in Woodbridge Township. The "Prodac" digital computer system, designed and built for power plant automation by Westinghouse, is schedule for installation in late 1961. Westinghouse is also supplying the steam turbine and generator.

"This automated unit," said R. S. Kersh, Westinghouse Vice President, Northeastern Region, "is a big step forward in industrial technology and perhaps one of the most important milestones in the company's history of service to the electrical industry."

The purpose of the computer system for electric utility use is three-fold: to increase plant efficiency, to provide for safer operation, and to improve the reliability of power plants which are getting bigger and more complex to handle.

The Prodac computer will be programmed to start, operate and shut down the entire new unit—the boiler, turbine-generator, and unit auxiliaries, following preestablished programs for both normal and abnormal operating conditions. Prodac's programs are read into the computer from a punched tape. A memory unit keeps the programs in storage until they are needed.

Operating commands are executed by Prodac according to its computations, based on information received from hundreds of sensing points throughout the plant. The system will assimilate the output of instruments and relays at high scanning rates and will process these data and other data in storage to compute heat rates, boiler and system efficiencies, and other indexes necessary to optimize the unit operation.

Prodac will also calculate and continuously display the status of all key unit functions, as well as periodically, or upon the plant operator's command print out these data. The operators can also control operations at any time through conventional automatic or manual controls underlying the computer system.

In Next Month's

EEI BULLETIN

Summaries of activities of the Institute's:

- Committees of the Board of Directors
- Committees of the Public, Employee and Investor Relations Division
- Committees of the Engineering and Operating Division
- Committees of the General Division
- Also, a complete listing of EEI Officers, Board of Directors and Committee Personnel, including EEI Representatives on Joint Committees and other organizations, for the Administrative Year, 1960-61.

If extra copies of the BULLETIN, or the supplement with the listings of committee personnel, are desired, please write immediately to:

Editor, EEI BULLETIN

Edison Electric Institute

750 Third Avenue New York 17, N. Y.

Industry Prepares for 1961 Celebration of

National Electrical Week

PLANS to make the 1961 observance of National Electrical Week another outstanding industry endeavor were discussed in New York recently at a meeting of the full National Electrical Week Committee, representing all the major segments of the electrical industry. The 1961 week will be observed Feb. 5-11.

Planning Guide in Production

The 1961 Planning Guide is in production and will be distributed to 6,000 industry leaders and groups throughout the country in mid-October. It will outline details of how various participating groups can plan and carry out their own National Electrical Week observances.

Chairman H. A. Webster has announced that more than 80 companies have been contacted in efforts to build a strong nationwide backdrop for the week's activities. These firms engage in extensive national advertising in television, radio, newspapers, trade and shelter magazines and other media. Among the companies that have already indicated their intention to support the week are:

Admiral Corp., Allis-Chalmers Manufacturing Co., Aluminum Co. of America, Amana Refrigeration, Inc., American Motors Corp., American Radiator & Standard Sanitary Corp., American Telephone & Telegraph Co., The Babcock & Wilcox Co., The Black & Decker Manufacturing Co., Blaw-Knox Co., Carrier Corp., Cavalier Corp., Crouse-Hinds Co., Ford Motor Co., Foster Wheeler Corp., General Motors Corp. (Frigidaire Division), General Telephone & Electronics Corp., Goodyear Tire & Rubber Co., Hotpoint Co., I-T-E Circuit Breaker Co., Jones & Laughlin Steel Corp., The Maytag Co., Motorola, Inc., Ohio Brass Co., Owens-Corning Fiberglas Corp., Penn Controls, Inc., Philco Corp., Republic Steel Corp., Smoot-Holman Co., Thomas Industries, Inc., Triangle Conduit & Cable Co., Inc., Union Carbide Corp., United States Steel Corp., The Western Union Telegraph Co., Westinghouse Electric Corp., and The Wiremold Co.

The week's nine sponsoring groups have announced plans for extensive communications programs within their memberships to spearhead the observance.

The sponsoring organizations are: American Home Lighting Institute, Canadian Electrical Council, Edison Electric Institute, International Association of Electrical Leagues, International Brotherhood of Electrical Workers, National Appliance Service Association, National Association of Electrical Distributors, National Electrical Contractors Association, and National Electrical Manufacturers Association.

A number of other important industry organizations are preparing materials for use during the 1961 week. Reddy Kilowatt, Inc., Electric Companies Advertising Program, and Public Utilities Advertising Association are all preparing copy and advertising materials for their particular audiences.

In addition, observance materials will be offered through the NEW headquarters — speeches, reproduction proofs of the NEW emblems, special pamphlets and display materials, Edison replica lamps, television film clips and others.

Exhibits Planned

Several special exhibits are planned by industry groups. The Seventh Annual National Electric Farm Power Conference in Louisville Sept. 21-23 will feature an address by a representative of the National Electrical Week Committee, and there are plans to erect a display. The National Electrical Contractors Association is planning a display and similar address for its October exhibition in Las Vegas, Nev.

Hydraulic Power Committee Meeting

- *Peach Bottom Atomic Power Plant*
- *Hydro Operations on the Susquehanna*
- *International Test Code Developments*

K. O. STRENGE
Chairman

TO accommodate an unusually full agenda and inspection tours to a number of important hydro installations and manufacturing shops, the 1960 Hydraulic Power Committee meeting was scheduled for four days. Convening in Philadelphia at the Benjamin Franklin Hotel on April 25-28, the meeting was highlighted by a dozen technical papers, a symposium on pumped-storage, subcommittee reports, and a round table discussion period. Fifty-three members and guests were in attendance.

As the session of the first day was called to order, T. S. Fetter, Jr., Executive Engineer, Philadelphia Electric Co., substituting for K. M. Irwin, Vice President of the host company, welcomed the group to Philadelphia. Of interest to the visitors was Mr. Fetter's reference to Philadelphia's rich historical background and description of his company's system. Mr. Fetter's remarks concluded with considerable detail on the new Eddystone supercritical pressure station.

Special Welcome Extended

At this meeting a special welcome was extended to A. E. Alspaugh, Pacific Power & Light Co.; W. E. Ehrensperger, Georgia Power Co.; H. K. Fairbanks, Ebasco Services Inc.; W. S. Lee, III, Duke Power Co.; E. S. Loane, General Public Utilities Corp., and D. J. Watkins, Utah Power & Light Co., who have joined the committee since its annual meeting of the past year. With Messrs. M. R. Barrows Pioneer Service & Engineering Co.; E. L. Bayles, Pacific Power & Light Co.; and A. T. Larned, Ebasco Services Inc., retiring, the committee's membership now stands at 29 hydraulic power design and operating engineers.

Several of the papers presented at this meeting described hydro installations and projects under study in the Eastern part of the United States. Others were concerned with a variety of problems incident to the generation of electricity from hydraulic power.

The first paper was presented by T. S. Fetter, who reviewed water temperature control studies. Mr. Fetter comprehensively reviewed the history of stream temperature regulation in the eastern United States, and detailed several studies underway on the effect of temperature rise on aquatic life.

Stanley Moyer, Assistant Chief Mechanical Engineer, Philadelphia Electric Co., and a former member of the Hydraulic Power Committee, cited fishing trends on the Susquehanna River before describing a study being sponsored by his company on fish in that river. The Philadelphia Electric Co. study involves the tracing of fish movements and the determination of the river water's quality.

An interesting departure from papers devoted strictly to hydraluic subjects was a discussion presented by W. S. Astley, Staff Engineer, Economic Analysis Division, Philadelphia Electric Co., on the Peach Bottom Atomic Power plant. Mr. Astley reviewed the development of the project and described some of the equipment that will be installed in this gas-cooled reactor station.

A comprehensive survey of the Delaware River Basin was presented by R. Van Vliet of the Pennsylvania Power & Light Co. Mr. Van Vliet, a member of the committee, cited unsuccessful efforts over a number of years for New York, New Jersey, and Pennsylvania tri-state contracts to be negotiated for allocation of the Delaware River's waters before the organization of the Interstate Commission on the Delaware River Basin in 1936. Mr. Van Vliet then described work presently being done by the Corps of Engineers to develop plans for water control and utilization in the "service area" of the Delaware River, wherein is located the country's heaviest concentration of industry.

P. X. English, Plant Engineer, Susquehanna Electric Co., and E. T. Schuleen, Assistant to the Manager, Safe Harbor Water Power Corp., teamed in presenting a paper on the operation of hydro stations on the Susquehanna River. The paper traced development of Susquehanna projects from the construction of the York Haven plant, which was completed in 1904. In addition to describing the integrated operation of the Holtwood and Safe Harbor plants for the most efficient utilization of river flow, Messrs. English and Schuleen also discussed the topographic and hydrologic features of the Susquehanna River Basin and the Federal and state flood forecasting service in the river area.

Passamaquoddy Project

A paper by O. L. Hooper summarized the more important factors and conclusions contained in published reports on the proposed Passamaquoddy project. The possibility of utilizing tides in the Eastport, Maine, area for the production of power has been studied numerous times over many years. Mr. Hooper detailed several proposed arrangements and estimated costs for this project.

Following Mr. Hooper's paper, R. D. Levy, who served as chairman of a special committee of Maine engineers appointed to study the 1959 report by the International Passamaquoddy Engineering Board to the International Joint Committee, advised of the findings of that

group. The special committee's report concluded that "the construction of the Passamaquoddy Tidal Power Project, or of any combination of Passamaquoddy tidal power and auxiliary sources, would result in a waste of our nation's materials, manpower, and money, and that the project, or any project combination, should not be built."

An outstanding feature of this meeting was a symposium on pumped-storage presented by a panel consisting of E. S. Loane, F. E. Jaski, J. D. Justin, and G. J. Vencill. Mr. Loane, in discussing the subject of pumped-storage parameters, considered factors involved in the determination of the feasibility of this type of project. Mr. Jaski, Engineer-in-Charge, Pump-Turbines, Allis-Chalmers Manufacturing Co., called attention to problems encountered in designing a hydraulic machine which can operate as a centrifugal pump when rotating in one direction and as a hydraulic turbine when driven in the reverse direction. Mr. Jaski's presentation also included consideration of pumped-storage plant design and operating problems.

Mr. Justin participated in the symposium by presenting a paper entitled "Pumped-Storage Site Evaluation." Mr. Justin concluded that "there are pumped-storage plant sites near load centers in the eastern States with probable costs ranging from $125 to $140 per kilowatt installed without transmission." Mr. Vencill followed Mr. Justin with a detailed discussion of his company's Taum Sauk project and factors involved in the decision to proceed with this pumped-storage installation.

At the conclusion of the symposium attention was shifted to operating and maintenance problems. H. R. Daniels discussed experiences with vibrations in the Poe, Butt Valley, Balch and Haas hydro stations placed in operation on the Pacific Gas and Electric Co. system during 1958. P. M. Lefever then presented a paper describing repairs to the upstream abutment face at the Conowingo Plant.

Test Code Developments

The committee was brought up to date on international test code developments by a progress report of IEC/TC4 (the Hydraulic Turbine Test Code Committee of the International Electro-Technical Commission) by Prof. L. J. Hooper. Also, for the information of the committee, H. P. Seelye, Consultant to the Research Projects Committee, reported on the Institute's research program, which is under the direction of that group. R. A. Lane of the Hydraulic Power Committee maintains liaison with the Research Projects Committee.

Subcommittee reports were presented by Mr. Vencill, Chairman of the Vibration in Hydroelectric Plant Subcommittee; T. J. Corwin, Chairman of the Pressure Regulations, Subcommittee; and J. H. Kime, Chairman of the Weather Modification Subcommittee. Mr. Vencill's group includes O. L. Hooper, H. R. Daniels, A. V. Dienhart, and P. M. Lefever. E. B. Strowger serves with Mr. Corwin on the Pressure Regulations Subcommittee, and C. A. Parrish and P. H. Yelton are members with Mr. Kime on the Weather Modification Subcommittee.

The meeting's technical sessions were climaxed by a round table discussion period during the afternoon of the third day, conducted by Vice Chairman R. A. Lane. This two-hour period provided a forum during which committee members and guests exchanged information on approximately 20 subjects of interest to hydraulic power engineers.

In conjunction with this meeting, inspection trips were made to the shops of the Baldwin-Lima-Hamilton Corp. and the Allis-Chalmers Manufacturing Co., located at York, Pa. The Conowingo, Safe Harbor and Holtwood hydro stations were also visited. These trips proved to be exceptionally instructive and interesting. The personnel of each of the plants visited did an excellent job of arranging the tours of their respective properties.

Chairmen Named for BLBS Bureau, National Electrical Week Observance

C. D. HOLLISTER, General Sales Manager, Niagara Mohawk Power Corp., has been elected Bureau Chairman and Chairman of the Executive Committee of Better Light Better Sight Bureau for a two-year term. He succeeds W. G. MCKIE, General Sales Manager, Rochester Gas & Electric Corp.

Mr. Hollister, a 1925 graduate of Tufts College, entered the utility field with Adirondack Power & Light Co. in Schenectady, N. Y. in 1928. Three years later this company became New York Power and Light Co. NYP&L became part of Niagara Mohawk Power in 1950. In 1958 Mr. Hollister moved to Syracuse, N. Y., as general sales manager for the Niagara Mohawk system.

H. A. WEBSTER, President of the National Electrical Contractors Association, has been elected Chairman of the 1961 National Electrical Week observance.

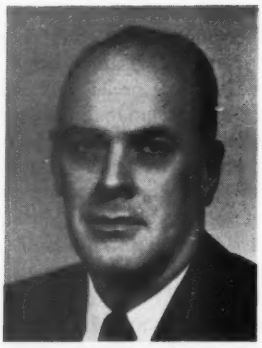
Mr. Webster, President of T. Frederick Jackson, Inc., Long Island electrical contracting firm, succeeds N. J. MACDONALD, President of the Thomas & Betts Co., Inc., Elizabeth, N. J., and President of National Electrical Manufacturers Association.

Mr. Webster has served as treasurer of the National Electrical Week Committee since its formation in 1956.

Other officers for the 1961 observance are: Vice Chairman, T. O. MCQUISTON, Vice President, Metropolitan Edison Co.; Secretary, A. W. HOOPER, Executive Director, National Association of Electrical Distributors; Treasurer, L. W. O'BRIEN, Manager of Monogram & Syndicated Information, General Electric Co.

People in Power

C. F. Avila



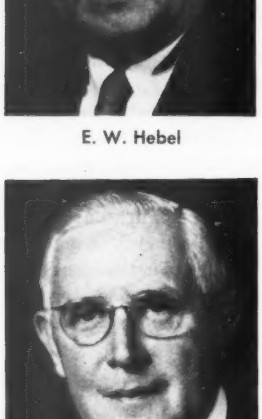
R. G. MacDonald

C. H. Blanchar

E. W. Hebel

H. E. Braunig

J. E. Murray



Reid Gardner

C. F. AVILA, Vice President and Assistant General Manager of Boston Edison Co., has been elected President of the company, the largest operating electric utility in New England. He succeeds the late T. G. DIGNAN.

Mr. Avila was graduated from Harvard in 1929 with degrees in electrical engineering and business administration. He joined Boston Edison that year. Prior to his designation in 1957 as vice president and assistant general manager, he had been vice president in charge of engineering and construction, and over a period of many years had various operating and engineering responsibilities.

A director of Boston Edison, The National Shawmut Bank of Boston, the Greater Boston Chamber of Commerce and the Electric Council of New England, he is a registered professional engineer and a member of the American Institute of Electrical Engineers. He is a member of the Algonquin Club and Beacon Society.

Mr. Avila was born in Taunton, Mass., where he attended local schools before entering college.

R. G. MACDONALD, Vice President-Marketing, West Penn Power Co., has been elected President of the Potomac Edison Co. His election followed the resignation of former President D. E. STULTZ, whose activities have been restricted by ill health since the first of this year. Both companies are in the West Penn Electric system.

Mr. MacDonald is an electrical enginering graduate of the University of Pittsburgh, and has been with West Penn Power more than 29 years. After some years in lines and construction work, he became, successively, district manager, division manager, assistant vice president, manager of general services, and vice president-marketing. In this post he had charge of sales, promotion, and development activities, including commercial, industrial, municipal, residential, and farm markets. In addition, his responsibilities included area development, public relations, and advertising.

He has served as chairman of the EEI Residential Group, and as a member of the EEI Sales Division Executive Committee, the EEI Awards Committee, the Pennsylvania Industrial Development Authority Board; and chairman of the United Fund of Central Westmoreland.

He had been chairman of the EEI Sales Division Executive Committee;

and is a member of the Sales Executives' Conference, the Illuminating Engineering Society, the Pittsburgh Chamber of Commerce; and a director of the Electric League of Western Pennsylvania.

E. W. HEBEL, President of Public Service Co. of Indiana, Inc., was elected Vice Chairman, and C. H. BLANCHAR was named President of the company, succeeding Mr. Hebel.

Mr. Hebel has been associated with the company in legal and executive capacities for 26 years. He received a B.A. degree from William and Vashti College in 1917, and studied at the University of Chicago. Following World War I, he received his bachelor of law degree from Harvard University in 1922.

Admitted to the Illinois Bar in 1922, Mr. Hebel began his practice of law with the Chicago law firm of Cooke, Sullivan and Ricks. In 1925, he was admitted to the practice of law before the United States Supreme Court, and in 1935 to the Indiana Bar. In 1931 he became a partner in the Cooke, Sullivan and Ricks firm, and served in this capacity until 1934 when he became associated with William P. Evans to form the law partnership of Evans & Hebel in Indianapolis. While engaged in this partnership Mr. Hebel also served as general counsel for Public Service Co. of Indiana, Inc., until 1946 when he became associated with this firm on a full time basis as general counsel. He was elected President in 1958.

Mr. Blanchar, who resigned as president and director of the Roddis Plywood Corp., Marshfield, Wis., to become president of the state's largest electric utility, is a graduate of the University of Wisconsin and the Harvard Graduate School of Business Administration. He is a certified public accountant. He began his business career in 1933 with the accounting firm of Arthur Anderson & Co. in Chicago. He later held executive positions with Commonwealth Edison Co. and United Airlines Corp.

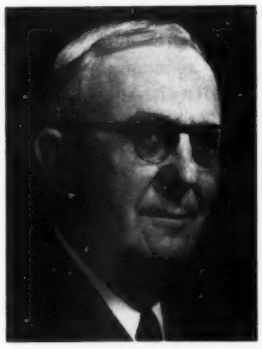
H. E. BRAUNIG, Executive Vice President of Central Illinois Electric & Gas Co., has been elected President of the company, and J. E. MURRAY, Vice President and Treasurer, was elected Chairman of the Board.

Mr. Murray succeeds D. C. MCCLURE, who has retired from active management, but continues as Chairman of the Executive Committee.

The new President joined Central Illinois E&G in 1942, after serving with Gulf States Utilities Co. At Gulf States he had been transmission and distribution superintendent for electric, gas and water services in the Texas and Louisiana divisions.

Mr. Murray began his association with the company in 1933 as treasurer. He was elected vice president and treasurer in 1944. Before joining Central Illinois E&G he was associated with Stone & Webster Service Corp., Brockton Edison Co., Key West Electric Co., Galveston Electric Co., Sierra Pacific Power Co., Pensacola Electric Co., and Gulf States Utilities Co.

P. O. Canaday



R. E. Ritchie

Wrong Caption

In the July-August, 1960, issue of the EEI BULLETIN, a photograph of R. E. Ritchie, Chairman of the Board, Arkansas Power & Light Co., was incorrectly identified as that of P. O. Canaday, newly elected President of the utility.

Photographs of both Mr. Canaday and Mr. Ritchie, correctly identified, are shown above. Mr. Ritchie was re-elected Board Chairman at the same time Mr. Canaday was promoted to President.

REID GARDNER, President and General Manager of Southern Nevada Power Co., has been elected Chairman of the Board of the utility. At the same time E. F. JOHNSON, Vice President, was elected Assistant General Manager, and A. E. PEARSON, Treasurer, and Harry Allen, Executive Assistant in Charge of Personnel and Purchasing, were elected Vice Presidents.

Mr. Gardner will continue to serve as President and General Manager. He has been in the utility business since 1924, when he joined the general office of Michigan Bell Telephone Co. in Detroit.

In 1930 Mr. Gardner went to Cedar City, Utah, as assistant general manager of the Southern Utah Power Co. This company was one of a group of Western and Canadian properties being operated at the time by P. B. Shaw, who was president of the company in 1930. In 1931 Mr. Gardner was elected vice president and general manager of Southern Utah Power, and in 1942 he was elected president and general manager of that utility. In 1947 he joined Arizona Edison Co. as vice president and operating manager. That same year he succeeded the late Mr. Shaw as president of Arizona Edison.

Mr. Gardner was elected president and director of Southern Nevada Power in 1954. He is in charge of all phases of the company's business.

Mr. Johnson has been a vice president of Southern Nevada Power since 1958. Mr. Pearson joined the company in 1956 as treasurer. Mr. Allen joined the company in 1946.

A. A. CASEY, Vice President, System Operations, The Cleveland Electric Illuminating Co., has been named Vice President, Engineering, of the utility. At the same time, H. T. SEALY, Vice President, was named Vice Pres-

ident, Operations. Mr. Casey succeeds C. J. BELLER, who is retiring.

Mr. Casey joined Cleveland Electric Illuminating in 1920 as a test helper. Before being appointed general superintendent of plants in 1943, he served as mechanical engineer and executive engineer. In 1952 he was named manager of power production, and the following year was elected vice president.

Mr. Sealy joined CEI in 1938. After serving as superintendent of the Eastern district, and as general superintendent of services, he was appointed manager of distribution in 1952. He was elected vice president the following year.

G. P. GAMBLE and A. H. SCHETTLER recently were elected Executive Vice Presidents of Union Electric Co., and R. D. WHITE was elected Comptroller of the company. DUDLEY SANFORD, Executive Vice President of the company since 1954, will retire Nov. 1.

Mr. Gamble, who was Vice President-Operations, will be in charge of operations of the utility, and will have executive responsibility for regional matters and labor relations. Mr. Schettler, formerly Vice President and Comptroller, will be in charge of fiscal, commercial, employee relations and matters of a general administrative nature. Mr. White, formerly Assistant Comptroller, will head the company's comptroller's division.

Mr. Gamble came to Union Electric in 1932 after completion of Bagnell Dam, where he had been resident electrical engineer for Stone & Webster, builders of the project. He was named superintendent of production in 1943 and was elected vice president of power production in 1950. Since 1954 he has been vice president-operations. He received an electrical engineering degree from the University of Virginia.

Mr. Schettler was employed as comptroller of Union Electric in 1940, after 16 years with Price Waterhouse and Co. He was elected vice president and comptroller in 1948. He received his bachelor's degree in business administration from Washington University and his master's degree from Northwestern University.

Mr. White came to Union Electric as assistant comptroller in 1941 after 14 years with Price Waterhouse. He is a business administration graduate of Washington University.

Mr. Sanford will retire after 41 years with the company. He came to Union Electric in 1919 from the Utah Power and Light Co. Beginning his career as an industrial sales engineer at Union Electric, he later successively served as treasurer of the old St. Louis County Gas Co., as Union Electric operating vice president, and as vice president and assistant general manager.

E. W. ROGERS, Chief Engineer and head of the Engineering Department, Dallas Power & Light Co., has been elected Vice President and Chief Engineer of the company. Mr. Rogers has been with the engineering department of the utility since 1923. He became chief engineer in 1956.

Mr. Rogers is past chairman of the North Texas Section, American Institute of Electrical Engineers, and is a licensed professional engineer in Texas. He is a member of the Texas and National Societies of Professional Engineers.

W. N. MARX, Manager of the Sioux Falls division, Northern States Power Co., has been elected Vice President in Charge of Operations, succeeding the late E. H. COTTON, Mr. Marx joined the company 31 years ago as a draftsman in the engineering department at Eau Claire. Except for five years in military service, Mr. Marx was in that department until 1947, when he transferred to the construction department at Minneapolis as superintendent of transmission construction. In 1952 he was named manager of the Sioux Falls division, and later manager of the Southwestern division.

W. A. MARSHALL, Vice President and Secretary and Treasurer, The Toledo Edison Co., has been named Senior Vice President of the company. J. P. WILLIAMSON, Assistant Treasurer, succeeds Mr. Marshall as Secretary.

In his new post, Mr. Marshall will have the continued responsibility for matters of accounting and finance. He joined Toledo Edison in 1915. He became assistant secretary in 1927, secretary in 1947, and treasurer in 1949. He was elected to the board of directors in 1950, and was elected a vice president in 1957.

Mr. Williamson will continue as assistant treasurer and, in addition to his duties as secretary, will direct methods and procedures, purchasing, and claims and real estate activities.

In the realignment of the company's accounting and finance department, W. R. MORAN, Controller, assumed direction of auditing and budgeting.

ROY TOLK, Vice President, Southwestern Public Service Co., has been elected Vice President in Charge of Division Management.

GEORGE DUPREE, Chief Engineer for Planning, was named Director of Rates and Budgets, and J. H. EVANS, Senior Electrical Engineer, Operating Department, was promoted to Chief Engineer, Planning Department.

Mr. Tolk joined SPS in 1938. He was elected a vice president in 1957, handling rate and budget matters. Before that time he had been assistant to the executive vice president and general manager, statistical engineer, and engineer and draftsman.

B. L. SMITH has been elected a Vice President of Community Public Service Co. Mr. Smith has served the utility as general counsel for 33 years, and was elected secretary in 1934. He received his A.B. and LL. B. degrees from the University of Texas and joined a Fort Worth law firm. After two years, in 1927, he joined Community Public Service.

L. S. BERRY, Superintendent of Transmission and Distribution of Central Illinois Electric & Gas Co.'s Rockford electric department, has been elected Vice President and General Manager of the company's Lincoln division. Mr. Berry joined CIE&G in 1949 as assistant superintendent of transmission and distribution, and two years later became superintendent. He served with Savannah Electric & Power Co. from 1930 to 1949, where he was secretary to the president, assistant sales manager, assistant line superintendent, line superintendent, and assistant superintendent of transmission and distribution.

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A. B. MORGAN, Secretary and Assistant Managing Director
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New York, N. Y.

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Transportation
K. G. SCANTLING
Duquesne Light Co.
Pittsburgh, Pa.

GENERAL DIVISION

GENERAL DIVISION EXECUTIVE
C. B. DELAFIELD
Consolidated Edison Co. of New York, Inc.
New York, N. Y.

Accident Prevention
A. J. NAQUIN
New Orleans Public Service Inc.
New Orleans, La.

Awards
A. M. WADE
The Connecticut Light & Power Co.
Berlin, Conn.

Electric Power Survey
A. S. GRISWOLD
The Detroit Edison Co.
Detroit, Mich.

Insurance
R. R. MacKAY, JR.
Philadelphia Electric Co.
Philadelphia, Pa.

Legal
D. K. KADANE
Long Island Lighting Co.
Mineola, N. Y.

Purchasing and Stores
R. B. GEAR
Commonwealth Edison Co.
Chicago, Ill.

Rate Research
R. E. CAYWOOD
West Penn Power Co.
Greensburg, Pa.

Research Projects
W. G. MEESE
The Detroit Edison Co.
Detroit, Mich.

Statistical
J. L. KENNEDY
Rochester Gas and Electric Corp.
Rochester, N. Y.

Technical Exchange for Overseas Visitors
HARVEY BUMGARDNER
The Detroit Edison Co.
Detroit, Mich.

PUBLIC, EMPLOYEE AND INVESTOR RELATIONS DIVISION

PUBLIC, EMPLOYEE AND INVESTOR RELATIONS EXECUTIVE
J. E. CORETTE
The Montana Power Co.
Butte, Mont.

Public Relations
P. V. HAYDEN
The Connecticut Light & Power Co.
Berlin, Conn.

Industrial Relations
W. H. SENYARD
Louisiana Power & Light Co.
New Orleans, La.

Investor Relations
A. H. SCHETTLER
Union Electric Co.
St. Louis, Mo.

SALES DIVISION

SALES DIVISION EXECUTIVE
C. D. LAWRENCE
New England Electric System
Boston, Mass.

Commercial Group
L. T. CALE
Alabama Power Co.
Birmingham, Ala.

Commercial Cooking & Water Heating
J. L. BEAVER
Metropolitan Edison Co.
Reading, Pa.

Commercial Lighting
W. P. GRAHAM
Philadelphia Electric Co.
Philadelphia, Pa.

Electric Space Heating & Air Conditioning
A. F. SOUTHWICK
Consumers Power Co.
Jackson, Mich.

Street and Highway Lighting
L. H. LINGEMANN
Duquesne Light Co.
Pittsburgh, Pa.

Farm Group
L. H. HAMMOND
New York State Electric & Gas Corp.
Binghamton, N. Y.

Farm Development
L. T. WANSLEY
Georgia Power Co.
Atlanta, Ga.

Farm Promotion
VIRGIL MARVIN
The Toledo Edison Co.
Toledo, Ohio

Industrial Power & Heating Group
A. D. SPILLMAN
Philadelphia Electric Co.
Philadelphia, Pa.

Competitive Service
F. F. DICKMANN
West Penn Power Co.
Greensburg, Pa.

General Power & Heating
W. BASCHNAGEL
Rochester Gas and Electric Corp.
Rochester, N. Y.

Industrial Sales Methods & Development
R. W. WYMAN
The Cleveland Electric Illuminating Co.
Cleveland, Ohio

Residential Group
J. H. K. SHANNAHAN
American Electric Power Service Corp.
New York, N. Y.

Home Service
MRS. MARGUERITE FENNER
Pacific Gas and Electric Co.
San Francisco, Calif.

Residential Appliance Promotion
H. R. NYE
Western Massachusetts Electric Co.
West Springfield, Mass.

Residential Electric Heating & Air Conditioning
C. E. ANDERSON
Virginia Electric and Power Co.
Richmond, Va.

Residential Lighting Promotion
R. W. SCHMIDT
Indianapolis Power & Light Co.
Indianapolis, Ind.

Residential Wiring Promotion
J. F. ROBERTS
Philadelphia Electric Co.
Philadelphia, Pa.

Advertising
O. K. LeBLANC
Louisiana Power & Light Co.
New Orleans, La.

Area Development
R. P. LEE
The Connecticut Light & Power Co.
Berlin, Conn.

Electrical Living Policy
W. M. SHEPHERD
Arkansas Power & Light Co.
Little Rock, Ark.

Market Research
G. L. LAHODNY
The Detroit Edison Co.
Detroit, Mich.

Sales Personnel & Training
G. J. STEFFEN
Union Electric Co.
St. Louis, Mo.

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